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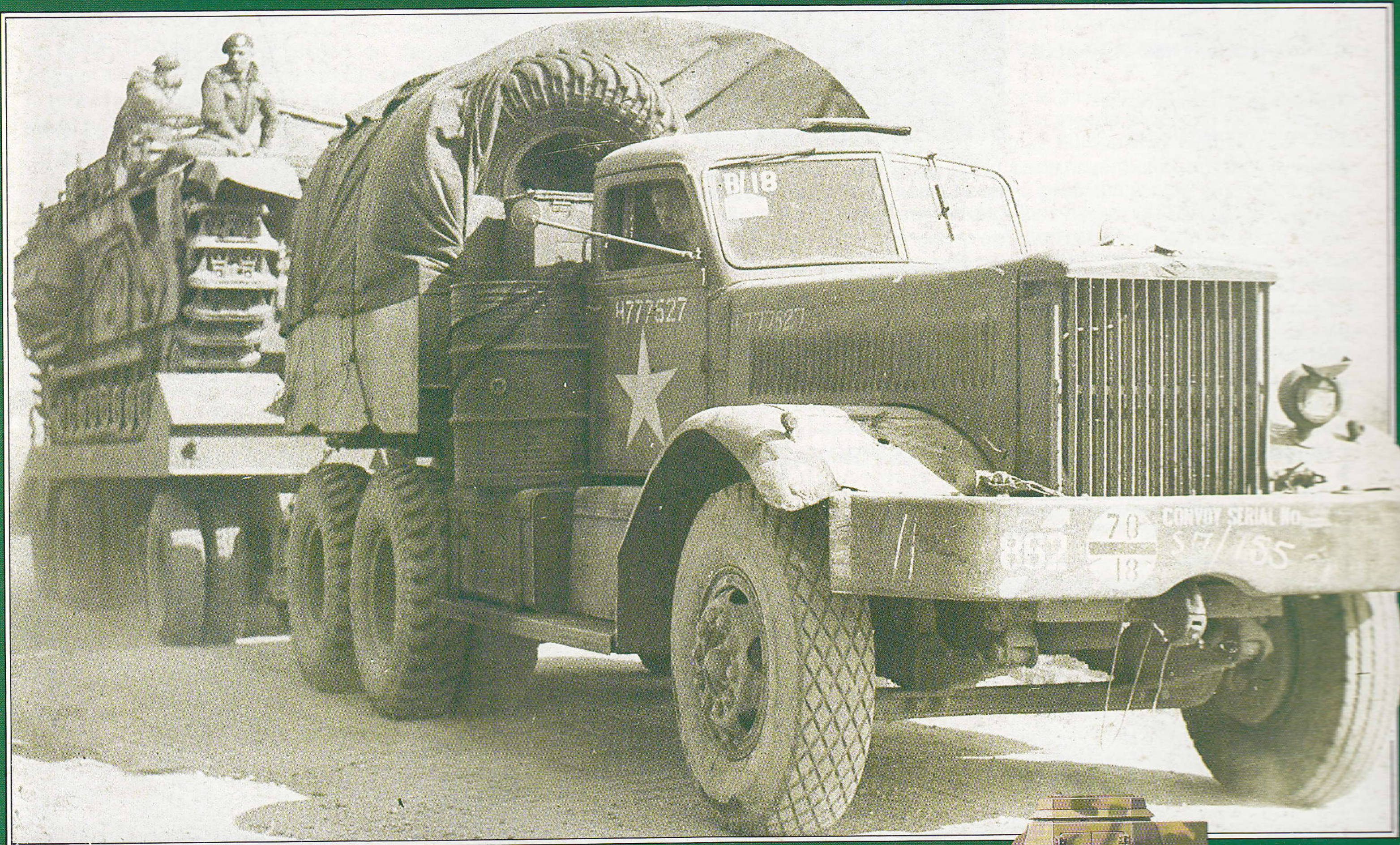

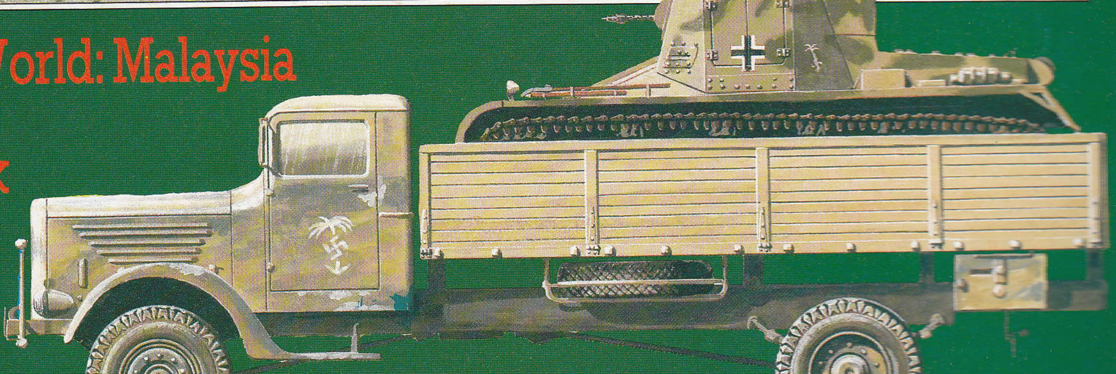

Armed Forces of the World: Malaysia

The Drive on Smolensk

Trucks don't eat hay

Half a million Jimmies

A fully illustrated guide to Trucks of World War II

WAR MACHINE

Volume 11 **Issue 125**

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Trucks of World War II

The sweeping strategic manoeuvres made by armoured forces in World War II were made possible by large-scale mechanization of transport; without massive fleets of lorries,* Blitzkrieg *would not have been possible and the tempo of the conflict could not have been sustained.

Transport vehicles were an essential element in armoured warfare. Tanks could wear out their tracks in under 100 km, hence the need for transporters.

Never had there previously been and in all possibility will there subsequently ever be so mobile a war as was seen during World War II.

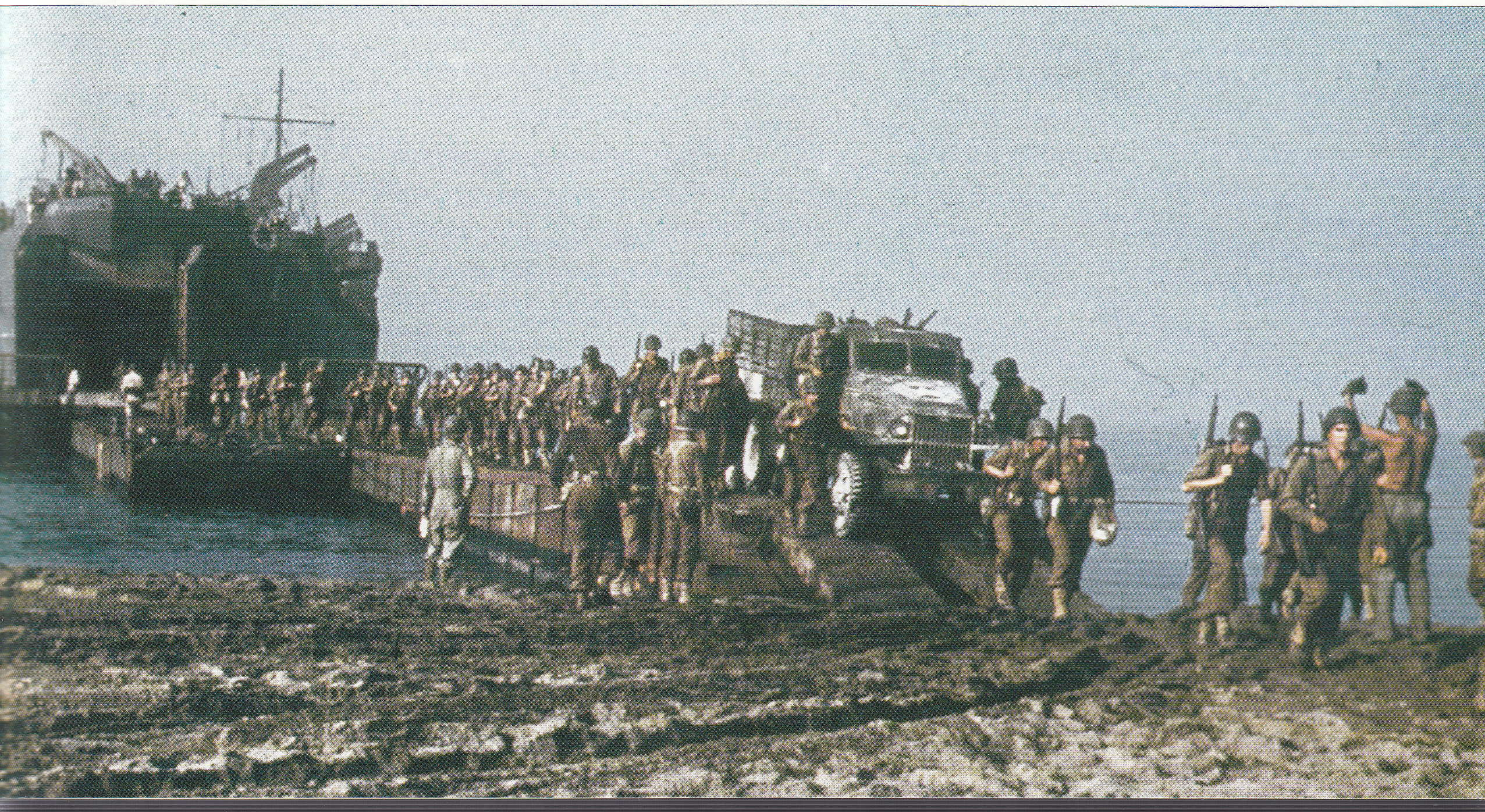
From the very outset, with the German Blitzkrieg on Poland, such warfare relied on mobility to push home the attack. During these early years much reliance was placed on the speed and efficiency of armoured thrusts backed by a mobile supply line. Unfortunately for the Germans, much of their supply line was still horsedrawn and the number of available motor transport vehicles was totally inadequate to the task. To compensate for this, many civil trucks were conscripted into service along with the few surviving vehicles of the Polish army. In contrast with this, the British Expeditionary Force that landed in France in 1939 was a fully mechanized formation.

During the evacuation of Dunkirk very few vehicles could be rescued. They were thus captured (along with many different types of French trucks) by the Germans and pressed into service, leading to yet more spare parts problems. After this the German logistic department tried to rationalize matters in a standardization programme involving the Schell system, but even this never reached its target before the end of the war.

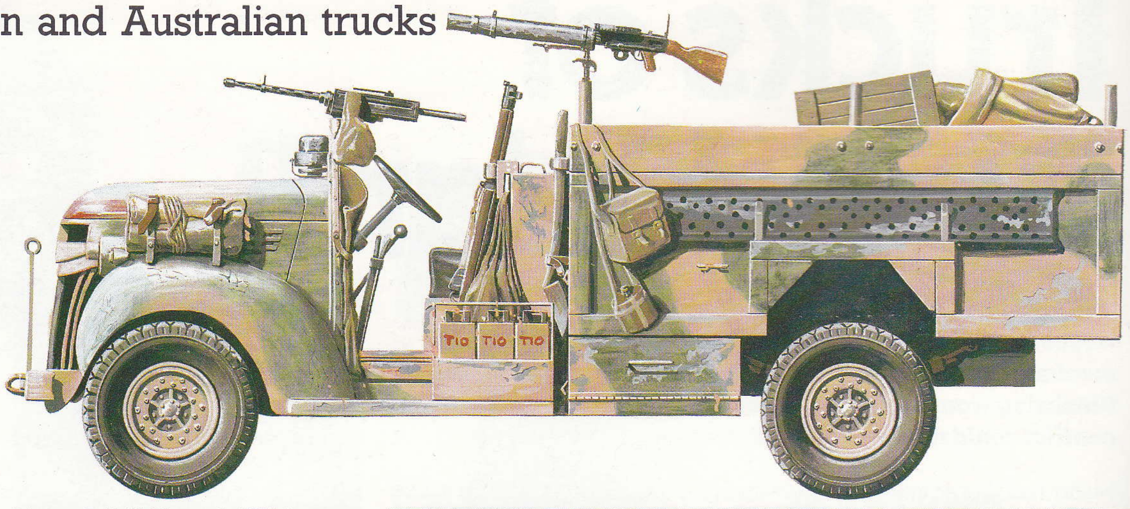
Perhaps the loss of about 90,000 vehicles in France was a blessing to the British military transport organization as it cleared all the 'dead wood' that would probably have been used and continued in production, and thus paved the way for fresh ideas. The chronic shortage of transport forced a further temporary introduction of impressment until specific types could be produced in greater numbers. The Commonwealth with its many assets was given the orders to produce many of these urgently needed types. Canada made a contribution out of all proportion to the size of its small automotive industry with its series of all-wheel-drive tactical trucks ranging from 15-cwt 4×4 to 3-ton 6×6, produced with various types of cabs from 1940 to 1943. During the early period the Canadian chassis and cabs were built to Canadian designs but to British specifications. The early wooden bodies were later replaced by pressed steel bodies.

The invasion of Europe was soon in the minds of the Allied planners, and considerable thought was being given to supplying the vast armies that would make the attack across Europe into Germany. It would require a supply system of a magnitude never before envisaged, and the production of trucks would be at a premium for the next two to three years. The British truck industry thus began to produce its own four-wheel-drive vehicles, such established names as Bedford, Ford, Karrier, Thornycroft and Albion being to the fore. Once the Allied assault had gained momentum the supply lines would soon be overstretched, and to help overcome this problem heavier 10-ton trucks were also put into production. The biggest supplier of all military trucks during World War II was the USA, although it was slow at first to respond to the ever-growing transport need of its own army and the now famous Lend-Lease system to the UK. As the whole might of American industry turned on to a war footing, however, trucks were produced in countless thousands, ranging from the ¾-ton Dodge 4×4 to massive Mack prime movers and Diamond T transporters.

Mainstay of the US Army was the 2½-ton GMC truck, seen here coming ashore at Salerno in 1944. By this time, the logistic tail of the US Army had grown to an enormous size.



Canadian and Australian trucks

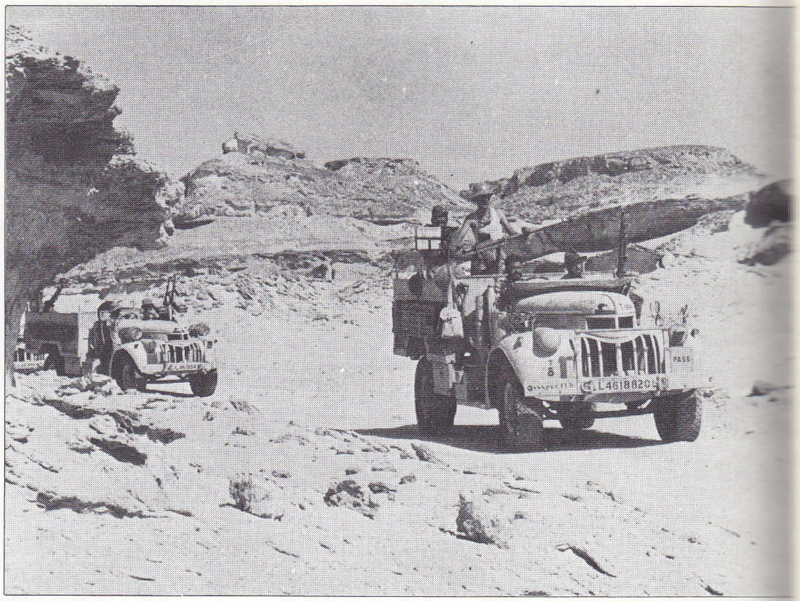


Above: A 1940 Chevrolet WA is seen in the configuration developed by the LRDG for their operations in North Africa. The vehicle illustrated carries a Lewis gun behind the cab and a Browning .30 cal M1919 with AA barrel above the dashboard.

To meet her urgent need for motor transport the UK turned to the Commonwealth for a degree of support, the major supplier to the UK from the Commonwealth being Canada. Canada herself, once on a war footing, had urgent need to supply her own armies with equipment as every transport vehicle then in service was of civil origin. During early 1937 Ford of Canada had been approached to produce 15-cwt trucks based on similar lines to those of British design. General Motors of Canada also participated. Ford's experimental vehicle was produced in no great haste at the Windsor plant, the pilot model being built up around a Ford V-8 chassis with wheels and tyres imported from England. When completed in 1937 the vehicle was tested at the then small army testing ground at Camp Petawawa, near Ottawa. On arrival it was discovered that the specification had changed to a four-wheel drive application. Nevertheless, the type gave a good account of itself, and the **Canadian Military Pattern Chassis** formed the basis of many 15-cwt and 8-cwt trucks. During early 1940 the standard pattern of Canadian truck began to emerge with four-wheel drive, and in July of 1940, after Dunkirk, the UK placed a preliminary order for 7,000 vehicles. By 1941 Canada was the Empire's main supplier of light and medium trucks. Standardization was again of the utmost importance within a range of trucks including 8-cwt, 15-cwt, 30-cwt and 3-ton 4×4, 3-ton 6×4 and 3-ton 6×6 vehicles. Various Canadian cabs were produced through the different stages of development: the number 11 cab was identifiable by the radiator externally mounted to the bonnet; the number 12 cab had the radiator mounted inside the bonnet; the number 13 cab was a complete revision in design to allow more cab interior space and better placing of the foot pedals, and also had a forward sloping windscreen; and the number 43 was basically a number 13 with a soft top.

The 3-ton 4×4 became the mainstay of Canadian production, and was a reliable vehicle produced by both Ford and Chevrolet. The body variations were enormous and can only be touched briefly within this text. All models were produced in the general-service role, some with timber and some with all-pressed-steel bodies, and other types included water and petrol tankers, mobile gun carriages, wireless house bodies, machinery vehicles (various types from 15-cwt mounted welding units to 6×6 fully-equipped workshops), office bodies, ambulances and other medical requirement vehicles, and breakdown and recovery vehicles. Canada also supplied many conventional types from all the large manufacturers, fitted with military tyres/wheels and bodies. Over 900,000 Canadian vehicles were produced within the five-year period.

The Australian commitment was not on so grand a scale, the majority of production trucks being in the light range. Most of the medium to heavy trucks were supplied in kit or chassis and cab form, usually from Canada, to which locally-built bodies were added. Some of the conventional trucks supplied were used in halftrack conversions, but this never progressed beyond the experimental stage. All Canadian Fords were reassembled at the Ford subsidiary plant at Geelong, in Victoria state some 48 km (30 miles) west of Melbourne.



Two Chevrolet trucks pass through a rocky area of the desert carrying an interesting assortment of weapons, including a Boys Anti-Tank rifle.

Specification

Ford F60

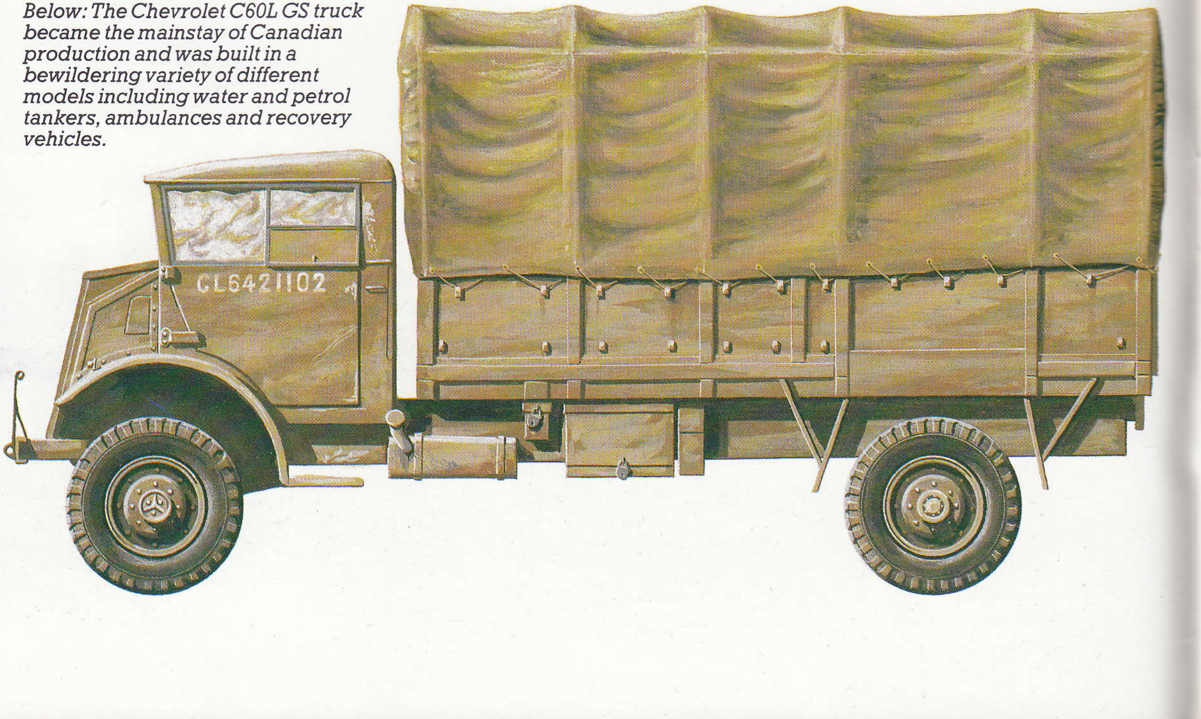
Powerplant: one 70.8-kW (95-bhp) Ford V-8 petrol engine

Dimensions: length 6.20 m (20 ft 4 in); width 2.29 m (7 ft 6 in); height 3.05 m (10 ft 0 in)

Performance: max speed 80 km/h (50 mph); range 270 km (168 miles)

Above: This Canadian-built Ford 3-ton truck is carrying a curious cargo of lighting equipment. Canadian Fords were also produced in Australia, the Ford subsidiary plant in Victoria State re-assembling vehicles for use in the Pacific theatre.

Below: The Chevrolet C60L GS truck became the mainstay of Canadian production and was built in a bewildering variety of different models including water and petrol tankers, ambulances and recovery vehicles.



The Drive on Smolensk

On 22 June 1941 Hitler launched the most titanic invasion in history, aiming to defeat the Soviet Union before autumn. The spearhead of the attack consisted of two Panzer armies commanded by Generals Hoth and Guderian; their task was to drive all-out for Minsk, then on to Smolensk, trapping Soviet forces in a gigantic battle of encirclement.

'When Barbarossa is launched,' declared Hitler, 'the whole world will hold its breath!', and indeed the forces massed along the Soviet frontier from the Arctic Circle to the Black Sea during that early summer of 1941 represented the greatest concentration of military force the world had seen to that date.

Three German army groups had under command 80 infantry divisions, 18 Panzer divisions and 12 motorized divisions, while behind them waited another 21 infantry, two Panzer and one motorized divisions in reserve: some two million men, 3,200 tanks, 10,000 guns. Already in position by mid-June to supply them were enough stores dumps, fuel and ammunition reserves to feed them over a 565- to 645-km (350- to 400-mile) advance, and 500,000 lorries waited in massed parks from East Prussia to Rumania to rush it forward on demand. To the modern mind the only questionable (indeed alarming) figure to emerge from the tables of statistics among the planning memoranda for Operation 'Barbarossa', is that for 'stabling': 300,000 horses were to play an apparently essential part in this monumental military exercise.

The disposition of the army Groups (and the directions of their advances) were dictated to a large extent by one inescapable geographical factor, namely the Pripet Marshes, a virtually uncrossable swamp nearly 160 km (100 miles) from north to south and 480 km (300 miles) from east to west, dividing Belorussia from the Ukraine. Because of this, there could be little contact during the first stage of the operation between Army Group South launched from Lublin towards Kiev and the lower reaches of the River Dniepr, and the two groups to the north. These were Army Group Centre aimed first at Smolensk and then (at least in the minds of the military leaders) at Moscow, and Army Group North launched out of East Prussia first towards Lake Peipus and then Leningrad.

Strength in the north

It was in the northern sector that the greater weight of the attack lay: 50 infantry, 13 Panzer and nine motorized divisions between the groups, and of the two, Army Group Centre was the stronger. Under the command of the icily aristocratic Generalfeldmarshall Fedor von Bock were two infantry armies, the 9th and the 4th, and two Panzer formations, III Panzergruppe under General Hermann Hoth and II Panzergruppe under General Heinz Guderian. These were the armies whose commanders intended to reduce Napoleon's feat of arms of 129 years earlier to historical obscurity, for they planned to reach Moscow in less than eight weeks and to annihilate the Soviet army in the process.

In this hope they were encouraged by Hitler, who had assured them 'We have only to kick in the front door and the whole rotten Russian edifice will come tumbling down!'

To Guderian, whose Panzergruppe consisted of three corps (XXIV, XLVI and XLVII) containing four Panzer divisions, this was the supreme moment of his military career. It was evident that he and Hoth between them commanded the most significant forces in the entire operation, and could well execute the most exciting and spectacular military feat of the century, perhaps of all history. And the first few days seemed to confirm the prospect.

Guderian's first task was to throw his Panzergruppe across the River Bug on each side of the fortress of Brest-Litovsk, capture the fortress and then drive precipitously forward with his armoured spearheads towards the city of Minsk, curving up to it from the south to meet Hoth's spearheads coming down from the north. Thus would the Soviet forces immediately behind their attack fronts be isolated in a huge cauldron in which, once their supplies had run out, they would have little alternative but to surrender.

Below: Wheeled transport precedes a pair of Panzer IIIs into a Soviet town during the triumphant German advance. Over half a million trucks were assembled to carry the Wehrmacht's supplies into the Soviet Union as well as 300,000 horses, for much transport remained horse-drawn.

'A battle won' – a German soldier passes the debris of victory in a Soviet town. Although the advance of the Panzer Divisions continued at a hectic pace, the thousands of Soviet troops which had been cut off often put up a hard fight, especially in urban centres.

This was all achieved in five days of breathtaking exhilaration which seemed to confirm Hitler's pronouncements and the optimism of the Wehrmacht leaders. The water-proofed tanks of the 18th Panzer Division forded the Bug before dawn on the morning of the attack, and Guderian himself crossed the river in an assault boat soon afterwards; his XXIV Corps captured intact all the bridges immediately to the south of the fortress, and although the Brest-Litovsk garrison reacted quickly and organized a resolute defence which lasted some days, Guderian's mobile units sped past and were 50 km (32 miles) on at Kobrin by the evening of their first day.

By 24 June, only 60 hours after the launch of the attack, the 17th Panzer Division was driving into Slonim, over 160 km (100 miles) from the frontier and half way to the Germans' first objective. There Guderian visited the division, taking part in a skirmish with Soviet infantry just past the village of Rozana, in which he himself acted as vehicle machine-gunner, before narrowly avoiding capture by more Soviet infantry on the way back to his command post. Guderian escaped this fate by rapid acceleration through the surprised enemy. It was all very exciting; and three days later, on the afternoon of 27 June, the leading tanks of the 17th Panzer Division drove into Minsk to meet the spearheads of Hoth's III Panzergruppe, which had covered 320 km (200 miles) in five days and accomplished the first stage of their mission.

But behind them they had left pockets of Soviet troops who, unlike those enemy forces similarly encircled the year before in France, showed little inclination to lay down their arms and surrender. There were four of these pockets: the fortress at Brest-Litovsk, six divisions around Bialystok, six more at Volkovysk, and another 15 between Novogrudok and Minsk itself. The task of first containing and then destroying and capturing them was assigned, in Hoth's and Guderian's minds, to the German infantry of the 4th and 9th Armies trudging stolidly behind the Panzer divisions.

Difficult roads

The trouble was that the infantry were now quite a long way behind, for the roads shown on the 'Barbarossa' maps proved in the majority of cases to be little but mud tracks which were quickly reduced to foot-deep dust, through which it was impossible to move at much more than 5 km/h (3.2 mph). And of the half million lorries which were supposed to be bringing not only troops but also the next issues of ammunition and fuel, a large proportion had been captured in France and proved to be totally inadequate for carrying heavy loads across rough country, besides having no reserve of spare parts. Moreover, they had already been driven from France across half Europe and their useful mileage had been almost consumed.

The 28th Motorized Division reached Smolensk on July 16. But many Soviet divisions were still active to the west and the advance was halted, perhaps fatally, as Hitler dithered over ultimate objectives.

Not surprisingly, arguments arose. Guderian and Hoth were convinced that they must immediately race farther ahead, first to Smolensk and then to Moscow, confident that speed would prove the decisive factor in this campaign. And with a burst of that insubordination which was later to mark the whole of the Russian invasion, on 1 July Guderian and Hoth released Panzer units towards the next obstacle, the River Beresina, and were threatened with court martial for so doing by their immediate superior, General Günther von Kluge.

T-34 success

On the same day, Guderian's Panzers met for the first time a Soviet T-34 tank, which blocked their advance for three hours, knocked out five PzKpfw III tanks and was only removed by an attack from the rear with an 88-mm (3.46-in) gun. Fortunately no more T-34s were encountered in the area and then, on 3 July, the order came for the next stage of the advance. So from his illicit bridgehead over the Beresina, Guderian launched the 18th Panzer Division towards the River Dniepr, which was reached on 5 July.

Here the division beat off a Soviet counterattack and then waited until all three of the Panzergruppe's corps were lined up along the river between Orsha and Stary Bykhov – with both flanks 'in the air', an increasingly tenuous supply organization and the support infantry two weeks' hard marching behind them! No wonder von Kluge remonstrated violently, and at first expressly forbade any attempt at further advance.

But every day the Germans waited there the Soviet defences would stiffen until the task of crossing the Dniepr would become impossible for anything less than an army group. Eventually von Kluge gave way: 'Your operations always hang by a thread!' he muttered, but gave permission for the next stage.

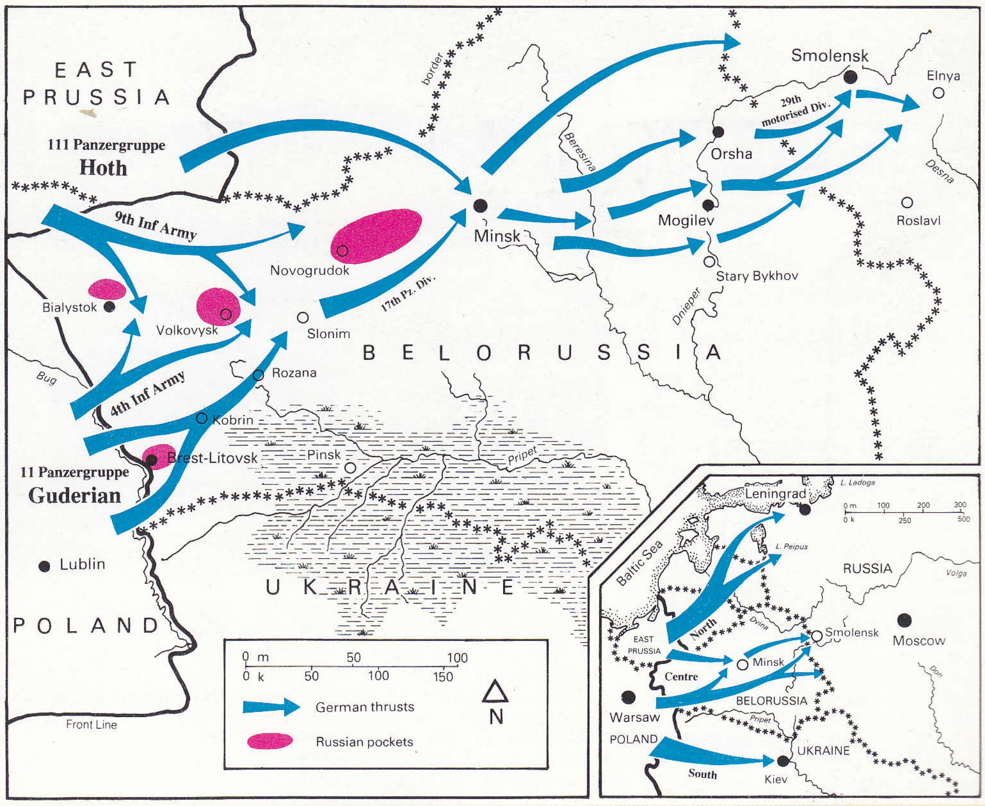
Three hard weeks

The next three weeks were occupied with the hardest fighting II Panzergruppe had yet experienced, for although advanced units of the 29th Motorized Division reached Smolensk on 16 July, fierce fighting still raged behind them and there was as yet no sign of Hoth's III Panzergruppe spearheads. For 10 days II Panzergruppe had three separate objectives to pursue: to bar the Soviet forces it had bypassed since crossing the Dniepr from escape south or east, to seek contact with III Panzergruppe fighting its way down from the north west, and to widen its hold on the land east of Smolensk (towards Roslavl and the River Desna at Elnya) into a solid bridgehead for the final thrust towards the Germans' great goal, Moscow.

But on 29 July Hitler's adjutant, Colonel Schmundt, arrived at Guderian's headquarters, bringing with him Hitler's felicitations and the Oak Leaves to the Knight's Cross (Guderian was only the fifth man in the army to receive them) and also the first hint of changes of plan and emphasis.

Moscow was perhaps not so important after all. The rolling wheatlands of the Ukraine would provide the granary from which the ever-growing Axis armies could be fed and, moreover, down in that direction lay the Baku oilfields.

Moscow could wait. Guderian for the moment must go no farther east.


EAST PRUSSIA
111 Panzergruppe Hoth
11 Panzergruppe Guderian
9th Inf Army
4th Inf Army
17th Pz. Div.
29th motorised Div.
border
Beresina
Bug
Pripet
Dnieper
Desna
Bialystok
Volkovysk
Novogrudok
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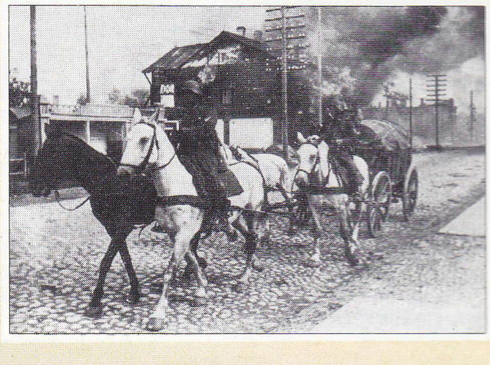
The staggering pace of Guderian's advance worried not only the Soviets but also the German staff, who feared that the enemy divisions which had been bypassed were still a threat and that the armour would outrun its supply-lines.



Above: A substantial proportion of the German transport remained horse-drawn throughout World War II, motorized transport being concentrated in the Panzer divisions and the motorized divisions.

Left: Marching on the road to Moscow in 1812, Napoleon's veterans had complained that the heat and dust of the Russian summer was worse than Egypt. It was the same for the Germans in 1941; after a late spring thaw temperatures soared and the wear and tear on both men and vehicles began to take a heavy toll.

GERMANY

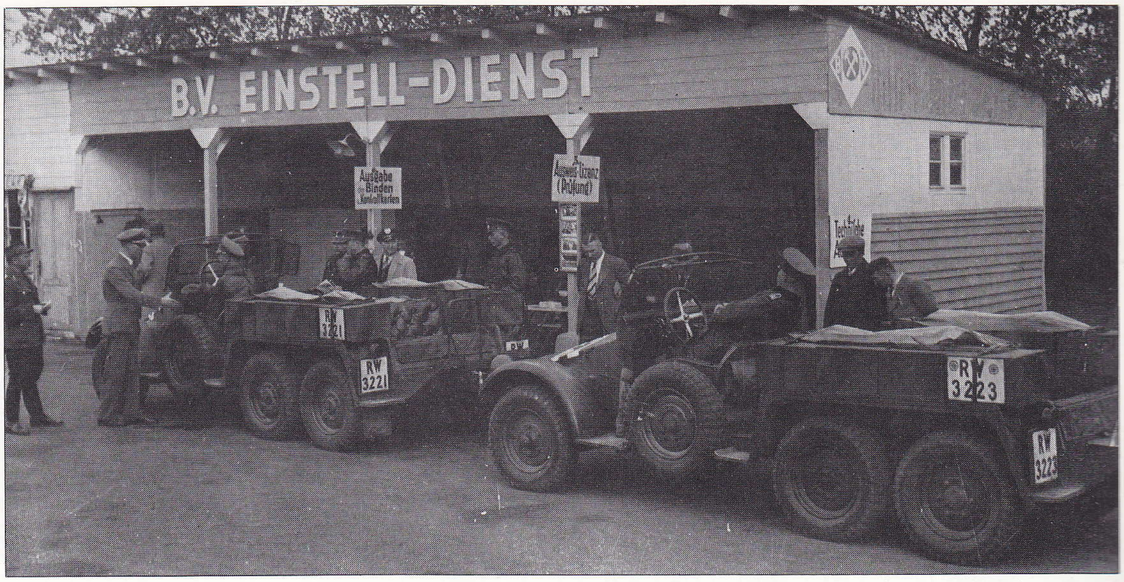
German light trucks

German light trucks before the outbreak of World War II were of commercial 4×2 design with only superstructure details to identify them as army vehicles.

The **Phaenomen Granit** had an air-cooled engine and was used in great numbers, most specifically in the ambulance role. Although the Granit was a useful vehicle for the transport of goods and supplies on hard roads, the type's cross country ability left much to be desired. A specification for a 6×4 truck was published and the response from the industry was immediate. Daimler-Benz had already built its **Daimler-Benz G3** 6×4 model from 1928, many for service with the German railways. Büssing-NAG of Braunschweig was also involved with its **Büssing-NAG G31**, in production from 1933 to 1935. Whilst all vehicles were fitted as standard with petrol engines, a few diesel engines were also fitted experimentally. Daimler-Benz, Buessing-NAG and Krupp produced chassis which were also used as the basis for armoured car bodies. Although a wide range of vehicle types were still in service during the invasion of Poland the Schell programme had introduced the idea of standard truck designs. For example the **Daimler-Benz 1500A** was built as the planned replacement for all current 2-ton payload types in service, many of which served in the German army for general-service use. Troop carrier versions were built on the lines of heavy cars with fold-down hoods.

Steyr of Austria built three basic types: a general-service truck, a heavy command car and a troop carrier, all powered by an air-cooled V-8 engine. Steyr also provided a 6×4 cargo **Steyr Model 640**, which was also produced in ambulance and command car variants. One of the most common types used during the early days of World War II was the **Krupp Kfz 81** 6×4, which was generally employed as an artillery tractor, a role in which it superseded the earlier **Kfz 69** purpose-built artillery tractor. The **Krupp Boxer**, as it became known, was powered by a 4-cylinder horizontally opposed engine and had all-round independent suspension.

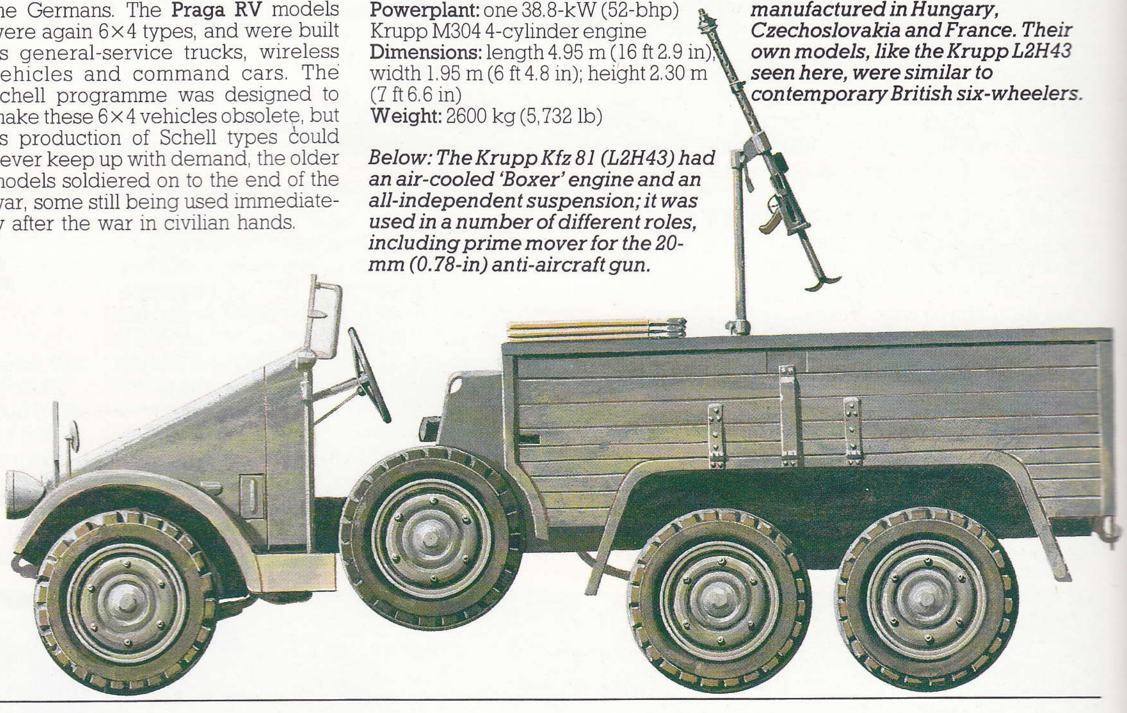
Hungary built few vehicles: one 6×4 personnel carrier for 14 men was the **Botond**. In Czechoslovakia Tatra produced the **Tatra T92** 2-tonner powered by a V-8 engine; this model was first used by the Czech army, and later by the Germans. The **Praga RV** models were again 6×4 types, and were built as general-service trucks, wireless vehicles and command cars. The Schell programme was designed to make these 6×4 vehicles obsolete, but as production of Schell types could never keep up with demand, the older models soldiered on to the end of the war, some still being used immediately after the war in civilian hands.



The Germans made extensive use of captured light trucks and vehicles manufactured in Hungary, Czechoslovakia and France. Their own models, like the Krupp L2H43 seen here, were similar to contemporary British six-wheelers.

Specification

Krupp Kfz 81
Powerplant: one 38.8-kW (52-bhp) Krupp M304 4-cylinder engine
Dimensions: length 4.95 m (16 ft 2.9 in); width 1.95 m (6 ft 4.8 in); height 2.30 m (7 ft 6.6 in)
Weight: 2600 kg (5,732 lb)



Below: The Krupp Kfz 81 (L2H43) had an air-cooled 'Boxer' engine and an all-independent suspension; it was used in a number of different roles, including prime mover for the 20-mm (0.78-in) anti-aircraft gun.

GERMANY

Opel Blitz

By the late 1930s the German military inventory presented an enormous logistic problem, with over 100 different vehicle types in service.

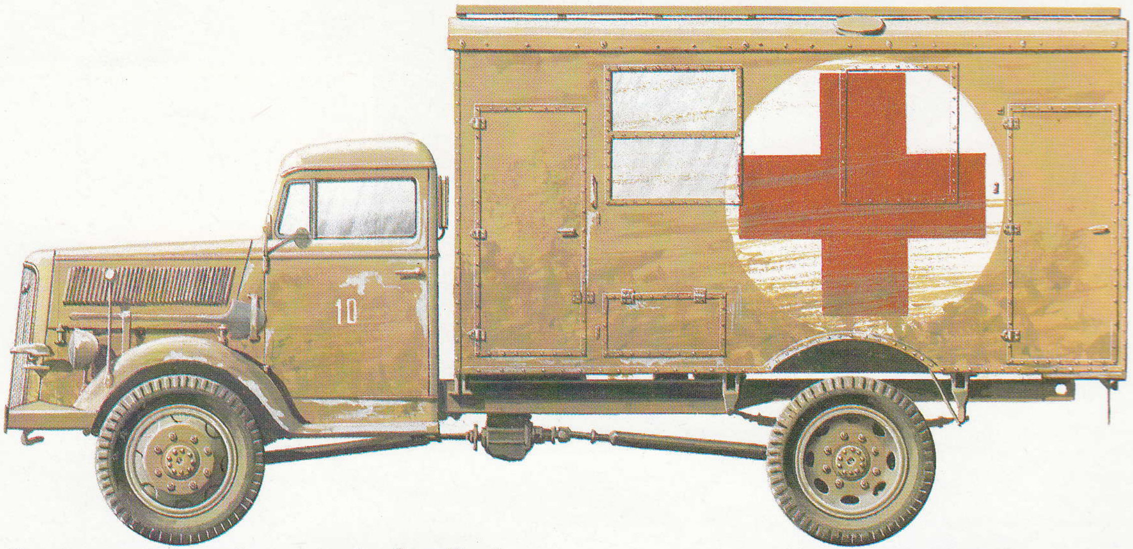
A desperate programme to rationalize this situation was put in hand under the leadership of General von Schell, who was then director of mechanization. His aim was to cut down the vast number of types and bring in a degree of standardization which, when plans were finalized, allowed just 30 vehicle types.

In the 3-ton medium category Opel's design was the most successful. The **Opel Blitz** 4×2 was of a conventional layout and featured a pressed steel commercial type cab with wooden body. Under the so called Schell programme all 4×2 vehicles were designated **Typ S**. The 4×2 was produced in many different variants, for example general service, fuel tankers, house body etc. As the need for better cross-country performance became a premium it was decided by Opel to produce a four-wheel-drive 3-ton truck with the designation **Typ A** and based on the same basic vehicle design as the Typ S. The addition of a driven front axle gave tremendous advantages over the normal 4×2 truck, and the wheelbase for the 4×4 was shor-

Opel Blitzes of the Afrika Korps are seen on a busy road in Libya, 1941. For all his panache as a tank commander, Rommel consistently neglected the logistics of the Afrika Korps and imposed an impossible burden on his transport columns.

Opel Blitz (continued)

tened by 15 cm (5.9 in). A two-speed transfer box gave the vehicle a choice of 10 forward gears. During the production span from 1937 to 1944 some 70,000 Opel Blitz trucks were built, as well as over 25,000 'Allrad' (four wheel drive) models. By late 1944, however, manufacture was totally disrupted by Allied bombing and the Allied advance across Europe, making plans to produce vehicles in 1945 fruitless. The variations of body design were numerous, the most popular model being the house body. The Blitz's possibilities were endless, and the vehicles were used as field ambulances, mobile laboratories, laundries, mobile command posts, field caravans, radio vans, cipher offices, and mobile workshops to name just a few. The body was made of timber and compressed card to save valuable steel. Later during the war when raw materials were desperately short, the cabs were produced from wood and pressed card and termed *Ersatz* cabs. During the winter campaigns on the Eastern Front even the four-wheel-drive vehicles were almost brought to a standstill, and the Waffen-SS developed a unique three-quarter track vehicle from an Opel Typ A and obsolete PzKpfw I tank track assemblies: the rear shaft was shortened and the driven axle was moved forward to line up with the sprockets, and because of its performance the **Maultier**, as the vehicle became known, was accepted for standard production. Similar conversions to Ford and Daimler-Benz vehicles were also carried out, but were not so numerous.



Above: An Opel Blitz Kfz 31 ambulance model. The Germans also used heavy car chassis ambulances and captured some, like the Austin K2. It was also used to carry mobile operating theatres.

Specification
Opel Blitz

Powerplant: one 54.8-kW (73.5-bhp) Opel 6-cylinder petrol engine

Dimensions: length 6.02 m (19 ft 9 in); width 2.265 m (7 ft 5.2 in); height 2.175 m (7 ft 1.6 in)

Weights: chassis 2100 kg (4,630 lb); payload 3290 kg (7,253 lb)

Performance: maximum speed 80 km/h (50 mph); range 410 km (255 miles)

GERMANY

German heavy trucks

Most German heavy trucks were basically civil-based vehicles or Typ S models under the Schell programme. The majority were 4×2 4½ to 6 tonners, such as the MAN ML4500 which was also built in Austria by OÄF. The **Mercedes-Benz L4500A** is a typical example of the type of German vehicle used by the Wehrmacht. Powered by a Daimler-Benz OM67/4 6-cylinder diesel engine, it formed part of the backbone of German army transport, and in one variant mobile anti-aircraft equipment was built on the Mercedes chassis in the form of a 37-mm Flak 41 gun.

An attempt was made to produce a tank transporter unit for use with PzKpfw I tanks, and a 4×4 version of the **Büssing-NAG** 6.5-ton lorry was used. Very little progress was made in this direction, and most tank haulage was carried out by the 6×4 **Faun L900D567** with a payload capacity of 8800 kg (19,400 lb). The German truck industry was never able to supply enough types to transport tanks, half-tracks with trailers eventually taking over this role.

With the German takeover of Czechoslovakia in 1938 many useful industries fell into German hands and were put to use supplying the German armed forces. In Kolin the excellent 6×6 **Tatra 6.5-ton** truck was produced with some outstanding features: they included a tubular frame and independent front and rear suspension, and power was supplied by a 12-cylinder air-cooled 157-kW (210-hp) engine. Skoda also supplied heavy trucks to the Germans, the **Skoda 6 ST6** 6×4 cargo truck generally being used in conjunction with four-wheel trailers. Skoda also produced one of the oddities of World War II, the 4×4 **Skoda 175** built as an artillery tractor for use in rough conditions on the Eastern Front. It featured huge steel wheels (1500×300 mm front and 1500×400 mm rear). Some of these production models were used in North West Europe.

Hanomag tractors were used to haul one or two laden trailers and were purpose-built for this role: the **Model SS100** was employed by the army and the Luftwaffe, the latter using the type to tow fuel bowsers. It was strictly a commercial type which was made available to the civil market. A larger but similar type was produced by Faun with a 13.54-litre engine, and this vehicle could be adapted to fit railway lines.

Right: The control of far-flung armoured forces depended on a reliable network of radio communications, based on mobile radio stations mounted on heavy trucks. This vehicle is part of a German divisional headquarters outside Tobruk in 1941. Heavy trucks were mainly used for specialist tasks, general supplies being entrusted to lighter vehicles and the railways.

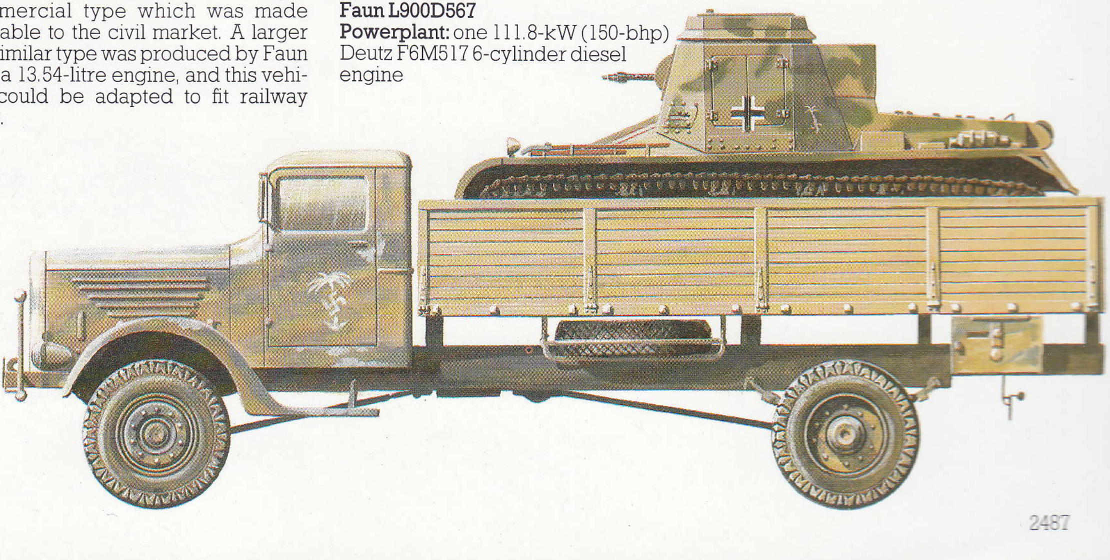
Overall the German transport system relied mainly on the railways, and on the road greater emphasis was placed on medium trucks.

Specification
Faun L900D567

Powerplant: one 111.8-kW (150-bhp) Deutz F6M517 6-cylinder diesel engine

Dimensions: length 10.40 m (34 ft 1.4 in); width 2.50 m (8 ft 2.4 in); height 2.60 m (8 ft 6.4 in)

Weight: 9200 kg (20,282 lb)



A Büssing-Nag 454 6½-ton 4×4 truck carries a PzKpfw I command tank in Afrika Korps colours. Only a small number of these vehicles were produced, the most widely used tank transporter being the Faun 6×4, which was capable of carrying the PzKpfw II.

Trucks don't eat hay

During World War I horse fodder took up more railway rolling stock than any other single supply item; indeed, the availability of horse fodder had dictated the pace of military operations for centuries. The development of motorized transport freed armies from this problem, but created some new difficulties in turn.

A column of British motor transport in Normandy, late July 1944, watches a Hawker Typhoon pass overhead. The reaction of German drivers would have been understandably different; Allied air strikes on German transport columns were devastatingly effective in slowing troop movements and denying vital supplies to the German front line.

With the rapid development of reliable mechanical transport at the end of the 19th century, it became obvious to a small number of military thinkers that the motor vehicle could make a significant contribution to the 20th-century battlefield. Mechanization was possessed of a number of distinct advantages over the traditional horse- and mule-drawn transport, but the innate conservatism of the military mind and the natural hostility of influential cavalry circles saw to it that in spite of the experiences of the Great War it would be decades before the horse would at last be replaced in the armies of the world.

In the British army mechanical transport first appeared between 1880 and 1890 in the form of steam tractors, and these were used as part of an instruction course at Chatham in Kent. Later a small number were used in the Boer War to tow trains of trailers and artillery, some of these trailers and steam tractors being armoured for added protection. During 1900 the mechanical transport committee was set up to investigate further use of mechanical transport in the army, and one of its first major decisions was to include military transport vehicles into the province of the Army Service Corps, all vehicles up to that time having been used by the Royal Engineers. During 1901 a trial for the use of motor vehicles in the army was carried out, one entry coming from Milnes-Daimler, which entered a vehicle with an internal combustion engine that ran on paraffin after starting on petrol. The War Office decided to purchase this vehicle, and over £30,000 was spent in developing a paraffin carburettor and further advances into steam wagons. During 1908 a major exercise to establish the use of vehicles was aided by the use of 94 London omnibuses, the successful object of the exercise being to concentrate a unit of troops at Shoeburyness. This led at last to the army planning for further orders for mechanical transport and a reduction in horsed-rawn vehicles.

Extensive development

Elsewhere the development of motor vehicles was taking immense strides. In France, for example, extensive use was made of petrol engines, and names such as Renault, Sautter, Chatillon-Panhard and Schneider began to emerge. Renault in particular produced many light commercial chassis during World War I for general service and as ambulances.

World War I revealed the full capabilities of motor vehicles and during the latter part of the war many thousands served with all the opposing forces. In Germany Krupp-Daimler was instrumental in producing a high-elevation anti-aircraft gun mounted on a medium truck chassis with a top speed of 48 km/h (30 mph). During this period Büssing produced some spectacular though cumbersome artillery tractors powered by 4-cylinder 60-kW (80-bhp) engines which were fitted with huge wheels for added traction in the mud of the front. One of the most significant vehicles to emerge in this period came from the stable of Henry Ford. The ever-popular Ford Model T was used by the British and US armies, the UK alone having a requirement for approximately 19,000. The French also made use of the lorry, the non-stop convoys along the 'Voix Sacrée' enabling the Fortress at Verdun to withstand the titanic German offensive of 1916.

With the 'Great War' over, a massive surplus of vehicles existed, and many were subsequently auctioned off and purchased by prospective civil operators. This massive influx of cheap vehicles on to the market caused a severe strain to the development of new trucks in the post-war era, and indeed many of the smaller manufacturers were forced to close down. Design during World War I did not progress to any great extent, except in the growing use of pneumatic rather than solid tyres. In the UK during the early 1920s the Mechanical Transport Advisory Board began to develop the 6×4 truck, and this became the standard design for the next two decades with a range of light, medium and heavy trucks in 30-cwt, 3-ton and 10-ton capacities. Great efforts were made to allow civil vehicles to use the patents produced by the War Office (including the final drive) and a subsidy was offered to civilian operators buying new vehicles of this type. The design was sound but cumbersome, and thus proved unpopular with civil operators: it was impossible to overcome this prejudice sufficiently to allow adequate production for war, and during the 1930s many were replaced by 3-ton 4×2 vehicles, which by this time had made great strides in efficiency.

In the inter-war period the pneumatic tyre became a permanent fixture on virtually all military vehicles. Germany during this design period had produced vehicles on the same lines as the British, many being militarized civil models because of the restrictions imposed by the Allies after World War I.

At the beginning of World War II there were sufficient vehicles for immediate use, but production would need to increase quickly, in terms of volume and rate, to cater for the needs of Europe's rapidly-growing armies. Germany and Italy never produced enough vehicles and, as explained in the introduction, were forced to rely on captured vehicles and impressed civil trucks, a far from desirable situation. The UK had a good production capability for military trucks, but after the Dunkirk evacuation development was stunted by the immediate need for as many vehicles as possible, and for the time being all production was based on the current types available. In desperation the UK turned to the USA for its military vehicle supplies, and as part of the famous Lend-Lease Act trucks were sent over and payment deferred to a later day. Some of the first vehicles to arrive from the USA were ex-French contract vehicles, for example the Dodge VK62 3-ton 4×2 cargo and GMC ACX504 trucks. Vehicles that had been supplied to France before her fall, such as the Studebaker K30, were either destroyed in France or used by the Germans. Once Lend-Lease was in full flow, supplies of trucks were quickly increased, and famous names (for example Mack, White, FWD, GMC, Chevrolet and Dodge) all supplied various makes and models.

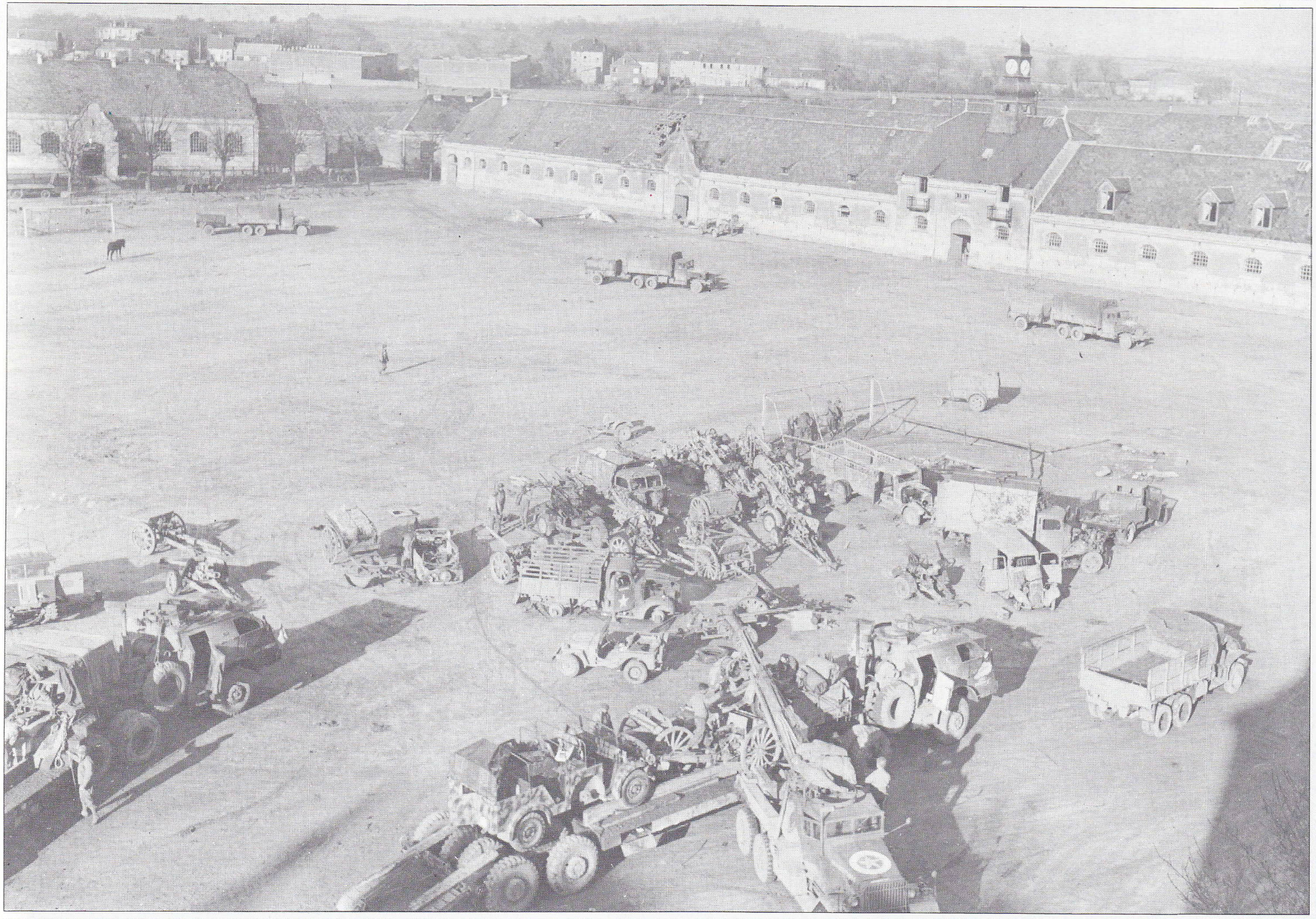
The British supplied the American manufacturer with designs and recommendations for various types required: one such vehicle, the Diamond T 980/981 tank transporter, saw extensive use and is still in service today.

With this influx of vehicles British industry could concentrate on its own development programme, the 3-ton four-wheel drive emerging as perhaps one of the most significant designs. Bedford produced its legendary QL model, one being modified with a lengthened chassis and body to accommodate 29 troops. This vehicle was quickly followed by the Thornycroft Nubian (a vehicle that saw extensive service well into the 1950s), the Crossley Q type developed for the RAF, the Albion FT11, the Austin K6 (nicknamed Screamer because of a noisy transfer case), Ford WOT 6 and Karrier K6.

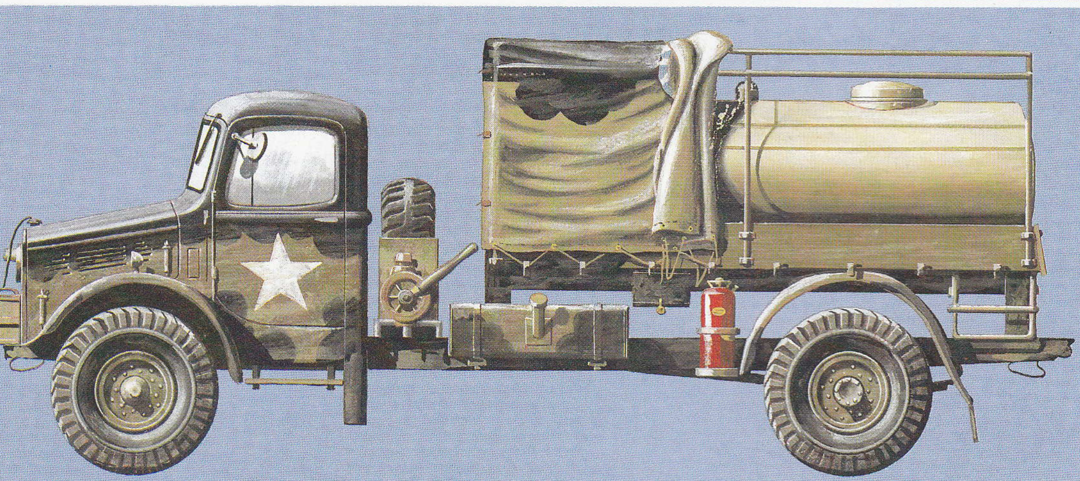
Canadian production increased to such an extent that in five years almost 900,000 vehicles were built for military use, and besides their own specific designs many conventional types were fitted with military bodies, wheels and tyres for delivery to almost every branch of the Allied services. Many were supplied as knock-down kits and crated for shipping to the required destination, there to be assembled before distribution.

LVTs of the 4th Royal Tank Regiment are carried towards the Rhine in preparation for the crossing in March 1945. The tank transporter is a Diamond T model, which was used in British service with its original trailer as well as the British models. Wherever possible, armoured forces made strategic moves by rail or on transporters.

German artillery parades through Paris in 1940. All European armies except the British were still heavily reliant on horse-drawn transport in 1940. Trucks could carry bigger loads over greater distances and did not require fodder. On the other hand, in time of adversity you cannot make a stew out of a Studebaker!



Above: An incredible mixture of vehicles and guns at the cavalry training school in Metz after its capture by the US 95th Infantry Division. The tank transporters are M25 'Dragon Wagons', the most widely used American tank transport. Also visible are trucks made by AEC, Opel, Büssing-Nag and Citroen.



Right: A Bedford 3-ton truck with GS cab in 'Mickey Mouse' camouflage scheme has its tarpaulin rolled back to reveal its tank. Bedfords carried both petrol and water tanks on a detachable superstructure. The 3-tonner was to the British army what the 2½-tonner was to the Americans – namely the largest vehicle which could be produced en masse.

Soviet vehicles were all of old stock, very little concern being given to truck production (factories such as GAZ and Zis supplying most) of designs that were still essentially 1920/1930s concepts. To offset this shortage the USSR received many of its supply trucks from the USA, Canada and the UK. The USA supplied over 400,000 trucks including most of the production line of the Studebaker 6×4.

Although most German vehicles were civil-orientated, developments were concentrated to major truck manufacturers, Opel with its Blitz being the most prominent. While the British used large single wheels, the Germans chose to remain with dual rear wheels on their 4×4 trucks, other manufacturers to produce 4×4 vehicles (although in lesser numbers) being Mercedes-Benz, Magirus, Klockner and Borgward.

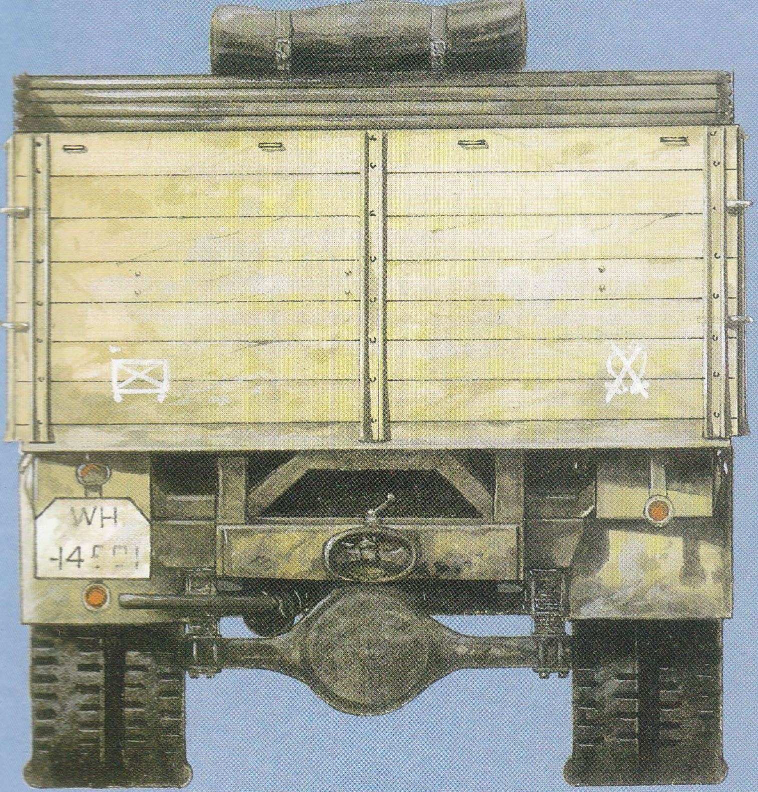
Like Germany, Italy had a heterogeneous collection of vehicles in service when the war started. Again vehicles were predominently of pre-war design, and after the collapse of the Fascist government in 1943 all production vehicles were used by the German forces. Fiat was the main supplier to the Italian and German forces.

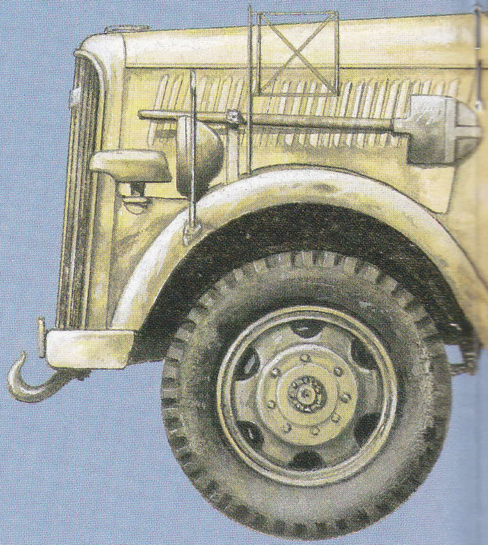
Japan had little use for motor transport due to its commitments in island and jungle terrain, which restricted the use of vehicles (although one would have thought that the operations against China would have led to more effective vehicle development). During 1931 the Japanese army found the need to improve its current vehicle range, and some 6×4 vehicles were obtained from Scammell and Thornycroft in England, and from Tatra in Czechoslovakia. After study by the truck industry, the 6×4 Isuzu Type 94 was assembled and became the most widely used vehicle in the Japanese army. At the outbreak of hostilities in 1941 approximately 24,000 vehicles were in military use. The mass production envisaged failed to materialize, largely because the big manufacturers (Toyota and Nissan) were ordered to produce aero engines.

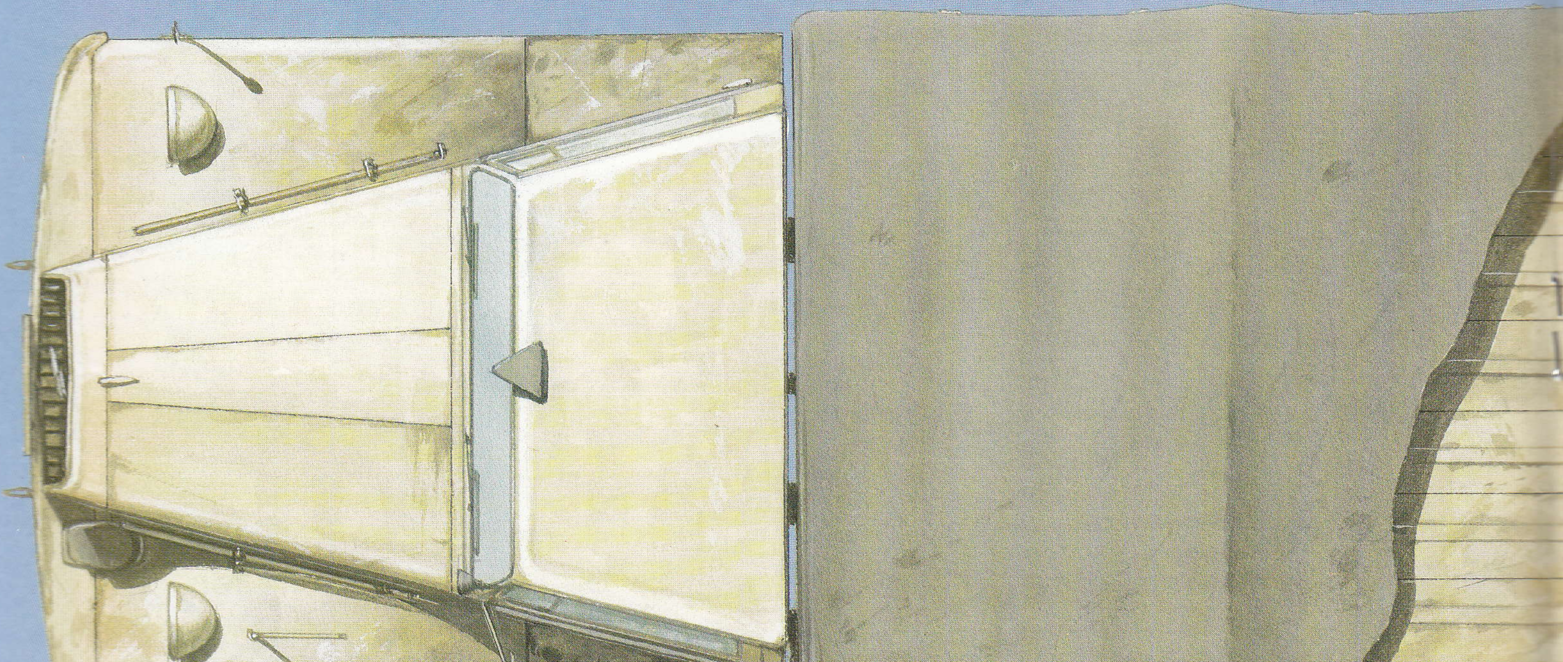
The development of special military types and, even more important, the need for standardization obtained during the war is evident to this day in military truck production.

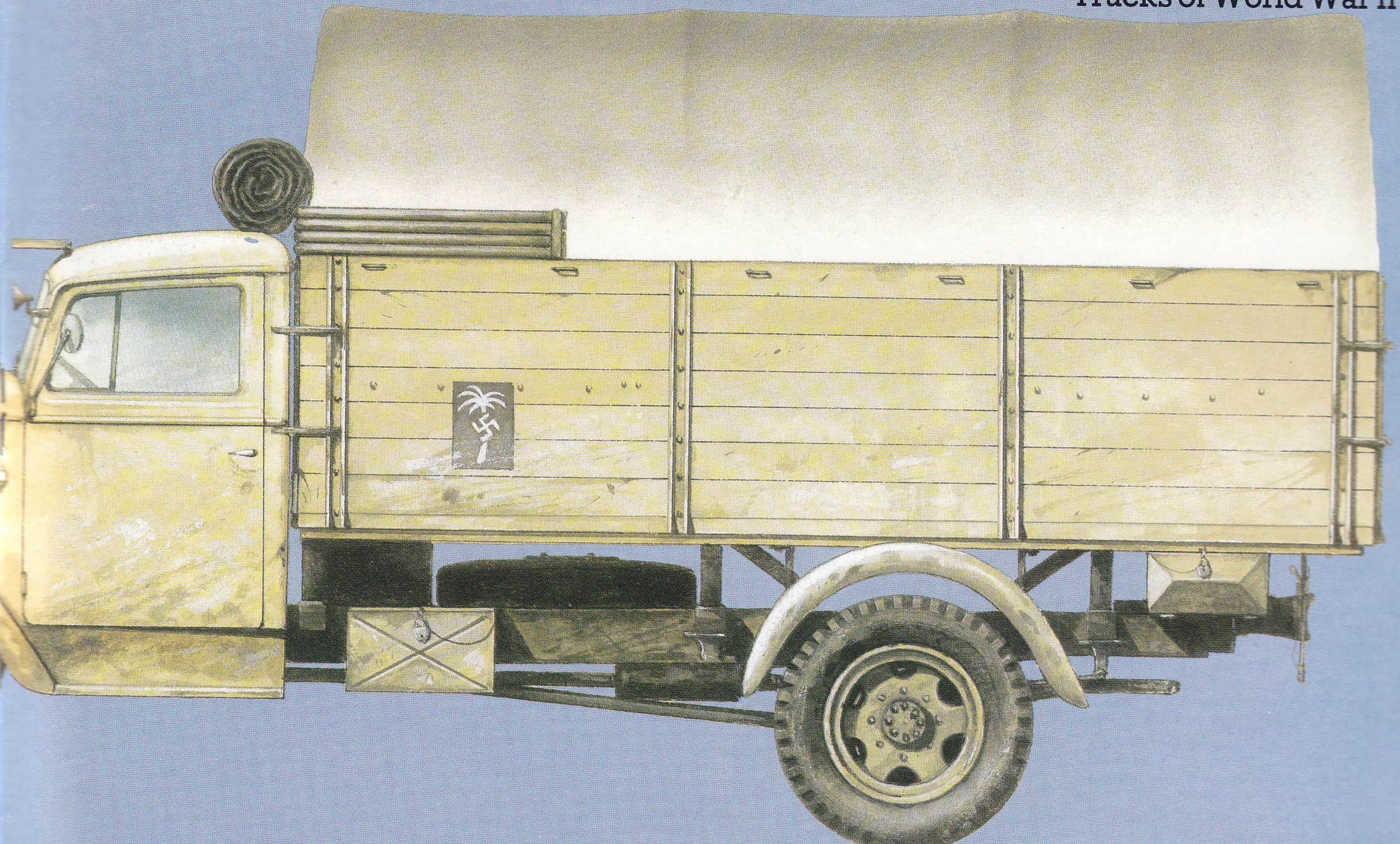
Opel Blitz

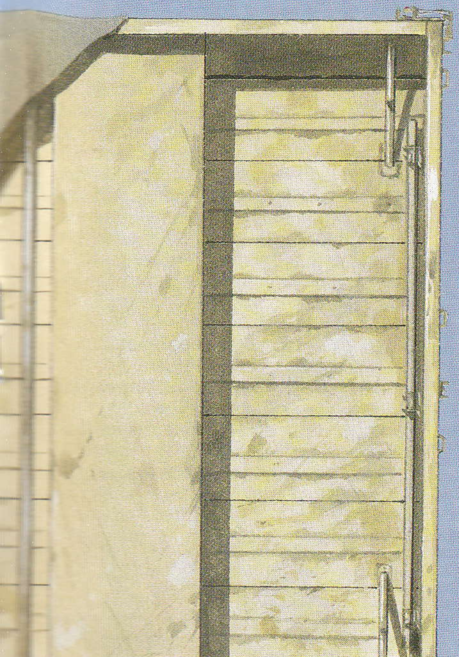
Opel Blitz trucks were among the many vehicles used by the Afrika Korps, although the continual backwards-and-forwards of the desert war saw the Germans equipped with large numbers of captured vehicles; indeed, Rommel preferred captured British trucks for desert operations, their large single rear tyres providing more traction than the twin rear tyres of the Opel. Nonetheless, the Opel Blitz was a mainstay of the Wehrmacht logistics effort, although the production of almost 100,000 vehicles in seven years compares unfavourably with over half a million GMC 2½-ton 6×6 trucks produced from 1941 to 1945.

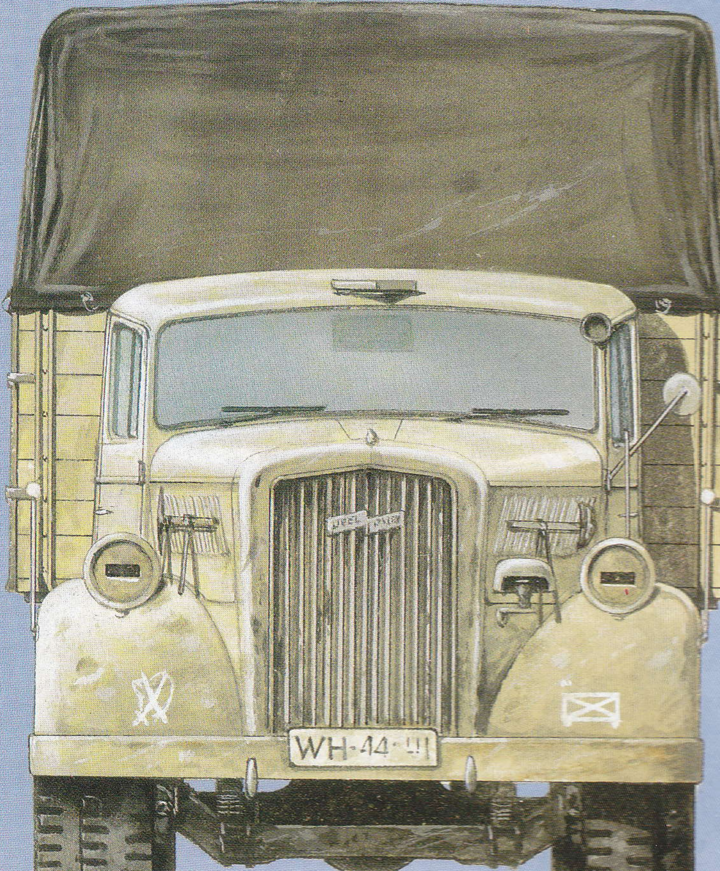








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UK

AEC Matador

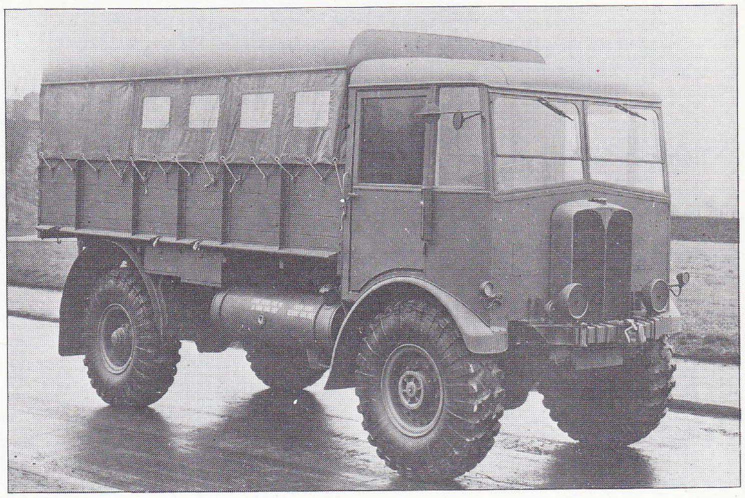
The **AEC Matador** 4×4 tractor first appeared in 1939, and was built to a War Office specification to tow 4.5-in (114-mm), 5.5-in (140-mm) and 6-in (152-mm) howitzers. The requirement was for a four-wheel tractor with seating for the crew and ammunition stowage. The early production vehicles had a cab roof of different shape to that of later production trucks, the latter having a circular hatch for air observation; when not in use this was covered by a small canvas sheet. The basic design of the cab was very simple and robust, being built on a wooden frame with steel sheets. The body was of conventional timber construction with a drop tailboard and a side door for use by the gun crew. Special runners were fitted to the floor to allow shells to be moved to the rear tailgate for unloading. The Matador was powered by a 6-cylinder 7.58-litre AEC engine producing 71 kW (95 bhp), allowing a top speed of 58 km/h (36 mph). For pulling purposes (for example extracting guns from mud) a 7-ton winch was fitted with 76 m (250 ft) of wire rope. The Matador was used in most theatres of the war. In the desert it proved to be extremely popular with the gun crews for its reliability, and photographic evidence shows that some had the tops of the cabs cut down to door level. Matadors were also pressed into service in the desert to tow transporter trailers because of the lack of proper tractors for this purpose. Total production of Matadors was 8,612. The RAF was also a major user of this vehicle, 400 being supplied in various offerings. The **General Load Carrier** had a special all-steel body with drop down sides and tailgate to facilitate easy loading, and the support posts could also be removed. Special flat platform trucks were also supplied to transport heavy equipment such as dumpers and compressors. An armoured command post was also built on this chassis, called the **Dorchester**, in which accommodation was provided internally for high- or low-powered radio transmitting and receiving equipment, and an external penthouse could be erected. As these vehicles were considered prime targets they were carefully disguised to look like general-service trucks.

An AEC Matador comes ashore from an American tank landing ship during the Allied amphibious operation at Salerno. Introduced as an artillery tractor in 1939, some of the 9,000 produced served for many years post-war, an indication of the soundness of the basic design.

Approximately 175 Matadors were built in 1942 as self-propelled gun carriages and comprised a 6-pdr anti-tank gun mounted in an armoured box. The cab and body were also armoured. Other variants included power equipment 20 kVA, power equipment 50 kVA, air-traffic control, and an experimental 25-pdr portée. The last did not progress beyond the prototype stage.

The last of the Matadors were auctioned off in the mid-1970s, this late disposal date proving the sound strength and reliability of these trucks.

Specification
AEC Matador
Powerplant: one 70.8-kW (95-bhp) AEC 6-cylinder diesel engine
Dimensions: length 6.32 m (20 ft 9 in); width 2.40 m (7 ft 10.5 in); height 3.10 m (10 ft 2 in)
Weights: unladen 7189 kg (15,848 lb) and laden 11024 kg (24,304 lb)
Performance: maximum speed 58 km/h (36 mph); radius 579 km (360 miles)

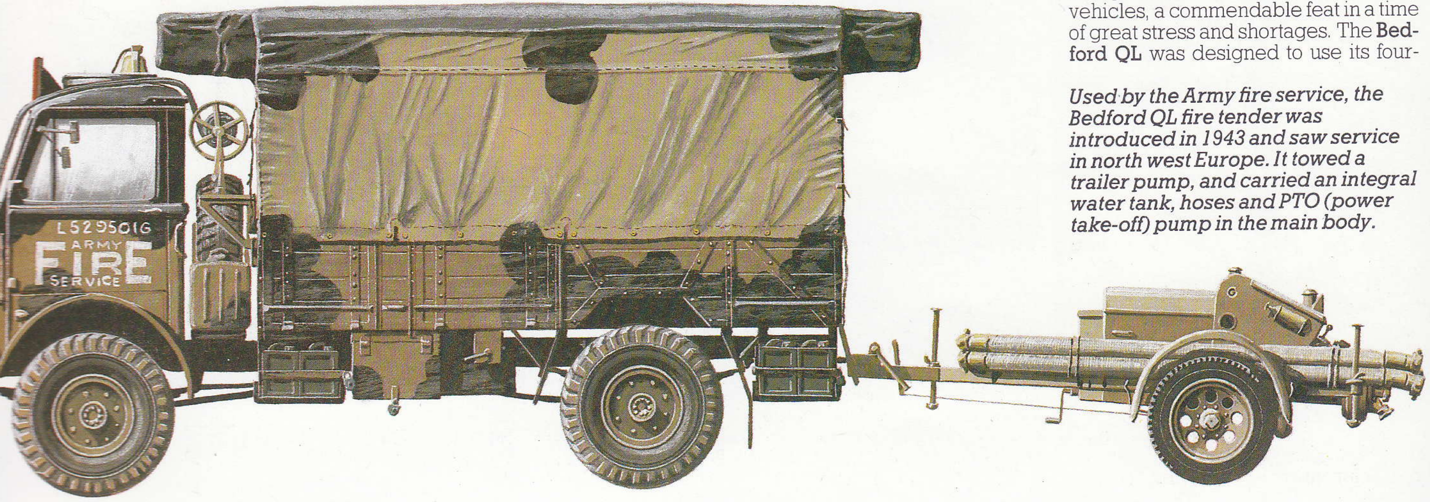


This AEC Matador has been fitted with the 'streamline' cab roof. Developed from a Hardy (AEC) design of the 1930s, the Matador was a medium artillery tractor used to move the 5.5-in (140-mm) medium gun.

UK

Bedford QL

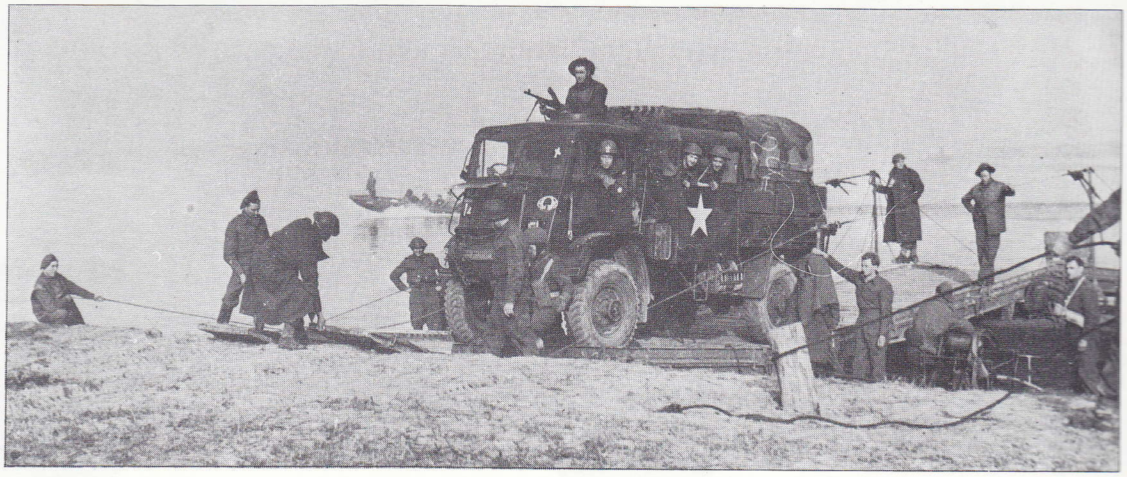
Bedford's involvement in four-wheel drive vehicles began in 1938, during the development stages of the square-nosed 15-cwt Bedford. It was suggested that the War Office be approached with permission to proceed with this design. Some degree of interest was expressed, but as no immediate requirement was envisaged the matter proceeded no further. Then Bedford decided to undertake private development on a low-priority basis with an eye to future military orders. After the outbreak of war the War Office issued orders for large quantities of 4×2 vehicles and also told Bedford to proceed with a prototype 4×4 3-ton general-service truck. In October 1939 a specification was approved, and on 1 February 1940 the first prototype was completed and was out on road tests. Within a month two more had joined it for extensive factory and military tests. The usual army tests were completed and the fitments for special tools installed, and drivers began training to operate this new truck. It had taken one year exactly from the first prototype to the first production vehicles, a commendable feat in a time of great stress and shortages. The **Bedford QL** was designed to use its four-



Used by the Army fire service, the Bedford QL fire tender was introduced in 1943 and saw service in north west Europe. It towed a trailer pump, and carried an integral water tank, hoses and PTO (power take-off) pump in the main body.

wheel drive on rough terrain, but could disengage the front drive for use on hard roads to ease the wear on tyres and gearbox, the change being effected by moving a lever on the secondary gearbox. Another feather in Bedford's cap (and a surprise one) was the lack of normal teething troubles during the QL's early use. It was only after about one year in service that the first sign of trouble occurred, and a rather peculiar one at that: a tendency for the vehicle to shudder when the brakes were applied slightly. These reports were followed up immediately, and it was found that only a small proportion of vehicles were showing this fault. After some time spent on investigation the fault was found to be simple, and the deep-treaded cross-country tyres were replaced by normal road tyres, whereupon the problem ceased.

The first production vehicle was the steel-bodied **QLD** issued to units of the Army Service Corps as a general carrier. From this model stemmed many variants, including the **QLT** 3-ton troop carrier with a modified and lengthened chassis to accommodate the extra long body to carry 29 troops and kit. The QLT was popularly known as the 'Drooper'. The **QLR** wireless house type was used by all arms of the signals. The truck featured an auxiliary generator, and other variants on this house type body were command, cipher office and mobile terminal carrier vehicles. A special requirement for use in the Western Desert was a 6-pdr portée, a vehicle designed to transport and fire a 6-pdr anti-tank gun from the body. It was necessary to modify the cab by cutting off the upper half and fitting a canvas top, and when this type became redundant the surviving vehicles were converted back to general-service types after being rebodied. The RAF was a major operator of the Bedford QL, many being used as fuel tankers with swinging booms to refuel aircraft. Two experimental vehicles that never progressed beyond the prototype stage were the **Giraffe** and **Bren**. The Giraffe was designed for amphibious landings: all the major components were raised (along with the cab) on a special frame for deep wading. When fully elevated the vehicle's automotive parts were raised 2.13 m (7 ft) and the driver 3.05 m (10 ft). The vehicle was approved for production in the event that the waterproofing system then in use failed. The Bren was developed by the Ministry of Supply by taking a standard Bedford QLD and replacing the rear wheels with components from the Bren Gun Carrier, thus creating a half-track. The aim of this scheme was to reduce rubber wear. The vehicle was considered adequate during tests, but the shortage of rubber did not materialize and the project was dropped.



A Bedford QLB light AA (Bofors) tractor comes ashore from a 'Class 9' ferry during the 21st Army Group's Rhine crossing in March 1945. The QL saw service for many years after the war, finally retiring in the early 1960s.

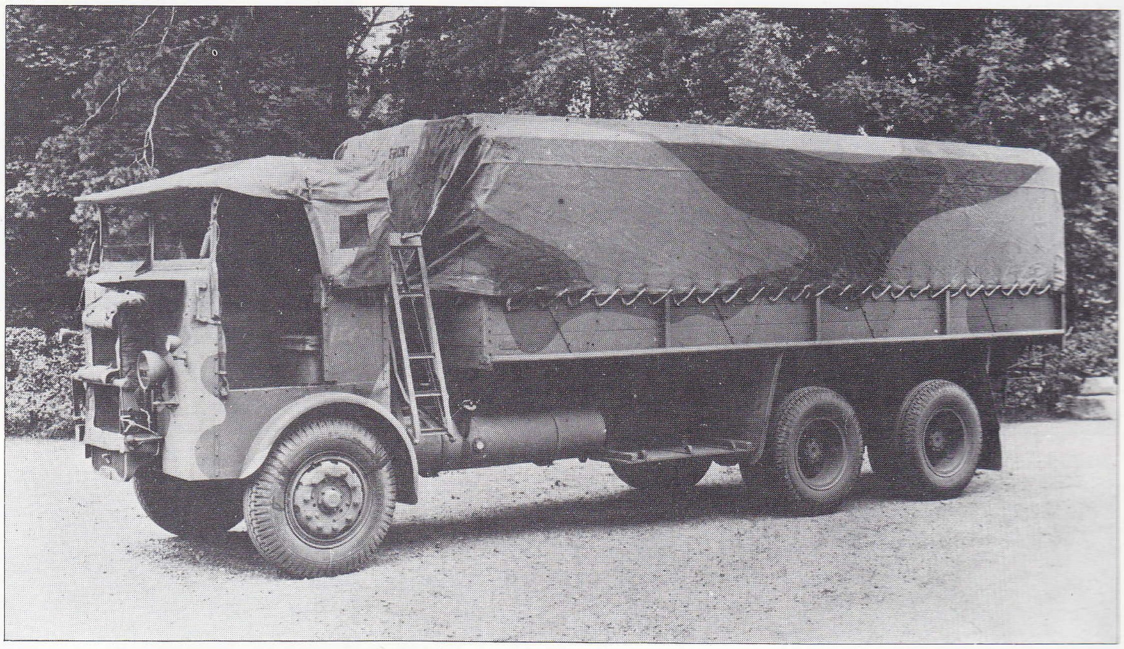
Specification
Bedford QLD
Powerplant: one 53.7-kW (72-bhp) Bedford 6-cylinder petrol engine
Dimensions: length 5.99 m (19 ft 8 in); width 2.26 m (7 ft 5 in); height 3.0 m (9 ft 10 in)
Performance: maximum speed 61 km/h (38 mph); radius 370 km (230 miles)

UK

Leyland Hippo

Designed as a heavy load carrier, the **Leyland Hippo** 6×4 10-ton truck entered military service in 1944 and eventually proved its worth hauling supplies during the closing stages of the Allied advance across North West Europe. The huge bodies on these trucks had a well-type floor incorporating the wheel arches, this giving a lower loading height, an important element in the war days as fork-lift trucks were few and much loading was accomplished by hand. Steel hoops and a canvas tilt gave weather protection to the stores carried. The **Hippo Mk 1** initial version was based on a pre-war commercial type with an open cab with canvas tilt and fixed windscreen, while the **Hippo Mk 2** had an all-steel cab. The Hippo Mk 2 had single rear wheels, whilst the **Hippo Mk 2A** had dual wheels fitted with 10-50-22 tyres. The difficulty experienced with the Mk 2A was the need to carry two spare wheels, one for the front and one for the rear. It is perhaps quite amazing to see these trucks still in service in the 1980s. Besides the general-service vehicle, many were fitted with large van type bodies, and several expandable body types were built, albeit of similar design. The side panels were split horizontally, the upper half being raised to form extra roof area and the lower half forming extra floor space to provide additional freedom around machinery. The vehicles could also be linked together to form a consolidated workshop area. Van bodies included an auto-processing type for developing photographs, an enlarging and rectifying type for exposing original film onto new film, a printing type with a rotary offset printing machine, and a photo-mechanical type equipped with a rotary offset printer, work tables and plateracks. Entrance to all these bodies was through a single door in the rear. Because of the length of the body, the spare wheel had to be transferred from behind the cab and placed under the rear of the chassis.

A post-war fitting was the adoption of a 9092-litre (2,000-Imp gal) AVTUR refueller body and, with the rear body removed, of a Coles Mk 7 or Neal Type QMC crane.



The 10-ton 6×4 format became widely used in the British army after the war. Manufacturers included Albion, Foden and Leyland. The Leyland Hippo, introduced in 1943, is seen here with WD pattern open cab and the GS body.

Specification
Leyland Hippo Mk 2 GS
Powerplant: one 74.6-kW (100-bhp) Leyland Type L 6-cylinder diesel engine
Dimensions: length 8.31 m (27 ft 3 in); width 2.46 m (8 ft 1 in); height 3.33 m (10 ft 11 in)
Weights: unladen 8941 kg (19,712 lb) and laden 19711 kg (43,456 lb)
Performance: radius 837 km (520 miles)

ITALY

Italian trucks

Many of Italy's trucks were of old design, but during the build-up of the Italian armed forces before the outbreak of World War II some measure of standardization was achieved. The largest supplier of trucks to the Italian army was Fiat. Fiat vehicles equipped most of the transport units, vehicles like the **Fiat TL37** 4×4 light truck having large wheels and tyres to suit the terrain of Ethiopia and the Western Desert. The **OM Autocarretta 32** was a unique light truck, and was highly regarded by its crews, and even by British troops when examples were captured. The type was intended primarily for mountain operations, and featured a 4-cylinder air-cooled diesel engine and independent suspension front and rear. The gearbox was centrally mounted and drove both front and rear axles direct. The medium-truck range was dominated by the **Fiat 38R** 4×2 and the **Lancia 3 RO N** 6½-ton 4×2. The latter vehicle also formed the basis of a mobile anti-aircraft mount. To start these trucks a hand-cranked inertia start unit was placed forward of the crankshaft. The power unit was a Junkers two-stroke engine. The **Fiat 633 BM** was built on similar lines to the Lancia.

Most Italian tanks were of the lighter types, and could therefore be carried in the bodies of the Lancia, though a tank-transporter trailer could also be used. Two other widely used vehicles were the **Fiat 626BL** powered by a 46-kW (62-bhp) engine, and the **Fiat 665NL**. The latter was quite advanced in truck body and cab design.

The Germans used large numbers of Italian vehicles, these seeing service on almost every German front. In Libya the British discovered that Italian diesel-engined trucks were of great value because of their lack of a carburettor, which had a tendency to clog up in dusty conditions.

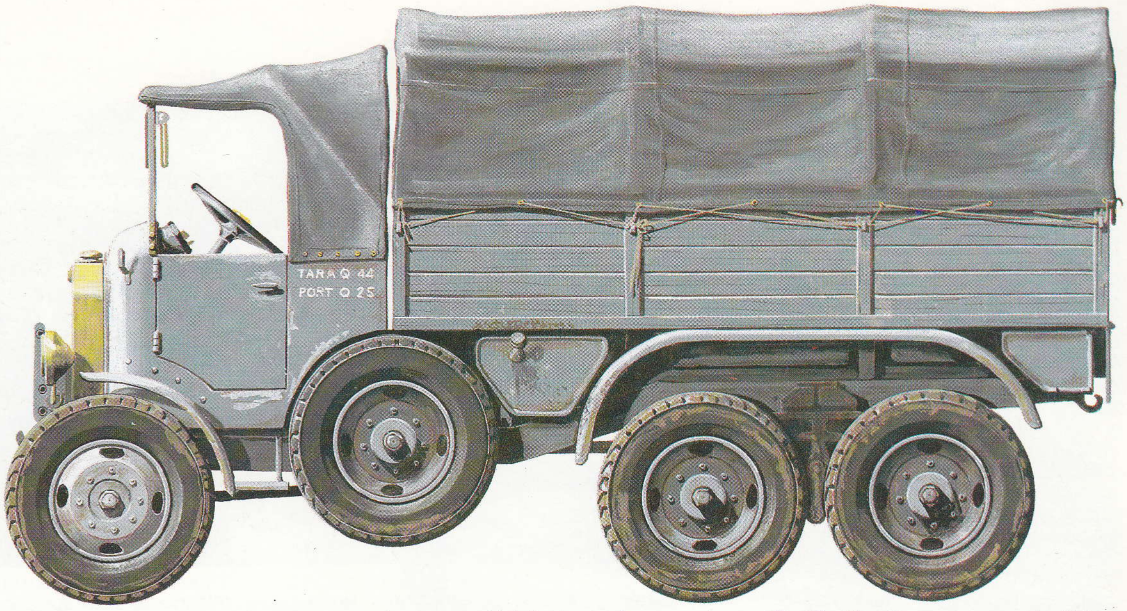
Specification

OM Autocarretta

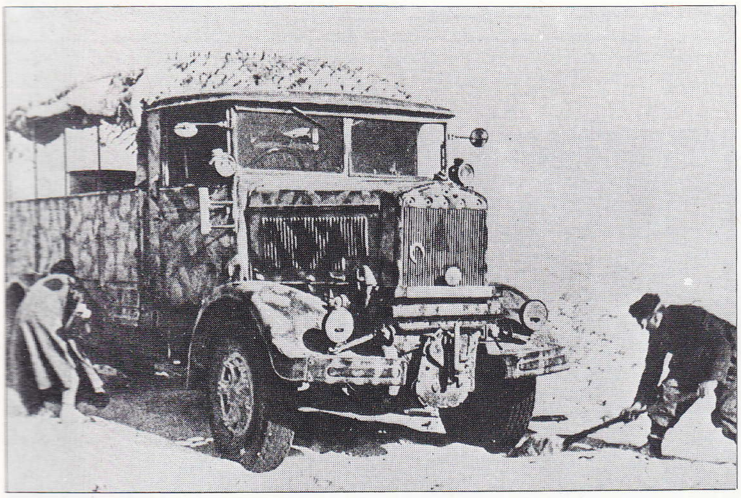
Powerplant: one 15.7-kW (21-bhp) OM Autocarretta 32 4-cylinder engine

Dimensions: length 3.80 m (12 ft 5.6 in); width 1.30 m (4 ft 3.2 in); height 2.15 m (7 ft 0.6 in)

Weight: 1615 kg (3,560 lb)



The Fiat/Spa Dovunque was built by the Spa factory, at that time under Fiat control. 'Dovunque' means cross-country (literally 'go anywhere').



A Lancia 3 RO N 6½-ton 4×4 AUP (Autocarro Unificate Pesante, or Standard Heavy Truck) is dug out of the sand in North Africa.

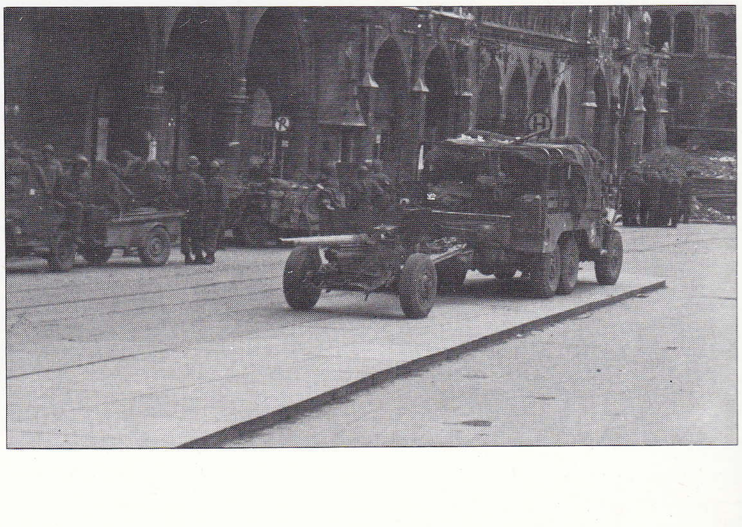
A Fiat/Spa Model 38R 2½-ton 4×2 truck is seen in use as an artillery observation post in the pause after the end of Operation 'Crusader'.

USA

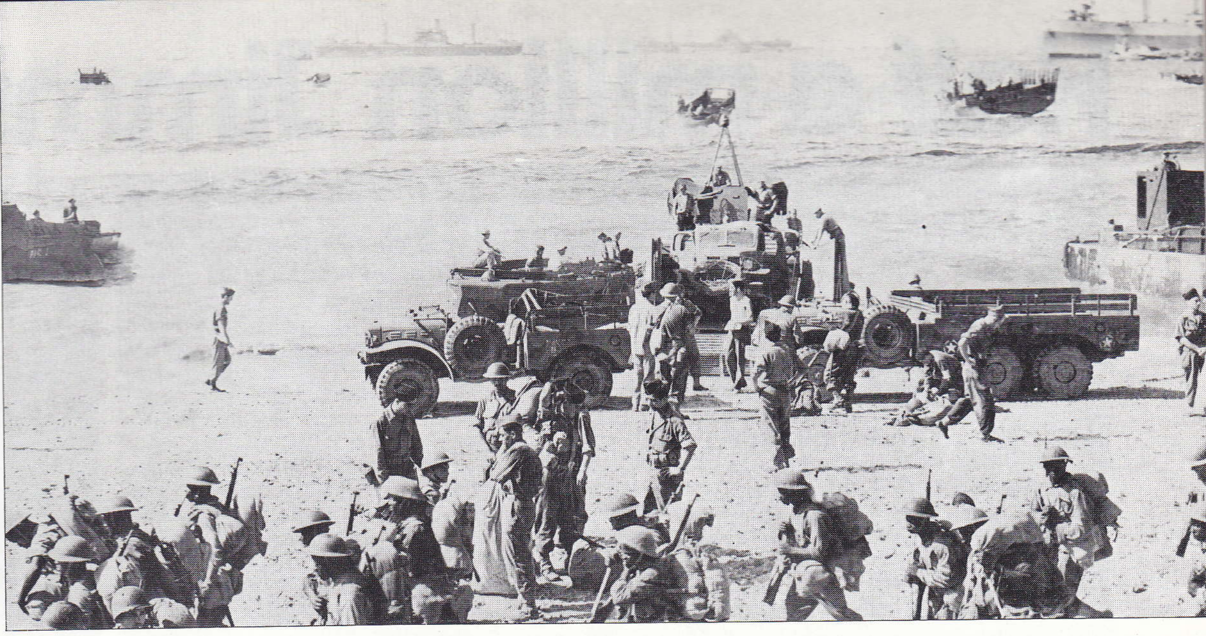
Dodge WC62

During 1941 the US logistic organization decided a vehicle was required to complement the ¾-ton Dodge T214 WC52 weapons carrier. The design was to include a larger payload area for stores or troops and the requirement called for a standardization of vehicle parts to be easily interchangeable. The front of the 6×6 **Dodge WC62** was typical Dodge, but the rear body was lengthened by 1.24 m (49 in) and a third axle was added.

The third axle allowed the doubling of payload compared with the ¾-ton Dodge. Other considerations besides interchangeability were envisaged during production, with the need for new military trucks increasing as the war drew on and it was decided that rather than design a specific new truck this type of adapted vehicle would enable the production lines to complete vehicles at a much faster rate. The two types used the same engine, clutch, transmission, front axle, steering gear, wheels, brakes, tyres, radiator, fan and belt, windshield, seats and electrical system. Basically designed as infantry carriers, these vehicles found their way into all arms of the American forces, including the Army Air Force. During stringent military tests the vehicle proved to have excellent stability as a result of its low centre of gravity and wide-tread tyres. Six-wheel drive and high ground clearance enabled



A WC62 towing an anti-tank gun (the M1 57-mm adaptation of the British 6-pdr) halts in front of Munich city hall as the 7th Army moves through the city in April 1945.



The ¾-ton Dodge T214 was elongated to produce the WC62, both shown here with French troops in the south of France in August 1944.

the vehicle to give a good account of itself over really rough terrain. Production of the personnel carriers continued throughout the war, many being distributed to other nations including the Free French, who were equipped almost entirely with American *matériel*. The majority of these vehicles were supplied with a complete canvas tilt, though a certain percentage was fitted with a pedestal gun mount on the passenger side of the cab to carry a 12.7-mm (0.5-in) machine-gun. Approximately 43,300 Dodge 6×6 trucks were produced between 1943 and 1945. Very few variants were developed on this chassis: one such was a scout car with an armoured shell fitted around the Dodge chassis and powerplant; another was the mounting of twin 12.7-mm (0.5-in) machine-guns (on a Gun Mount M33) on the rear body. This model was developed and tested in 1943, but no further progress was made. The 6×6 saw extensive use post-war until the Korean War, after which the type became surplus as a result of wear and the introduction of new equipment. Today the WC62 is a much prized vehicle within the ranks of vehicle preservation societies.

Specification
Dodge WC62
Powerplant: one 68.6-kW (92-bhp) Dodge 6-cylinder petrol engine
Dimensions: length 5.71 m (18 ft 8.75 in); width 1.91 m (6 ft 3.4 in); height 2.21 m (7 ft 3 in)
Performance: speed 80 km/h (50 mph); radius 386 km (240 miles)

USA

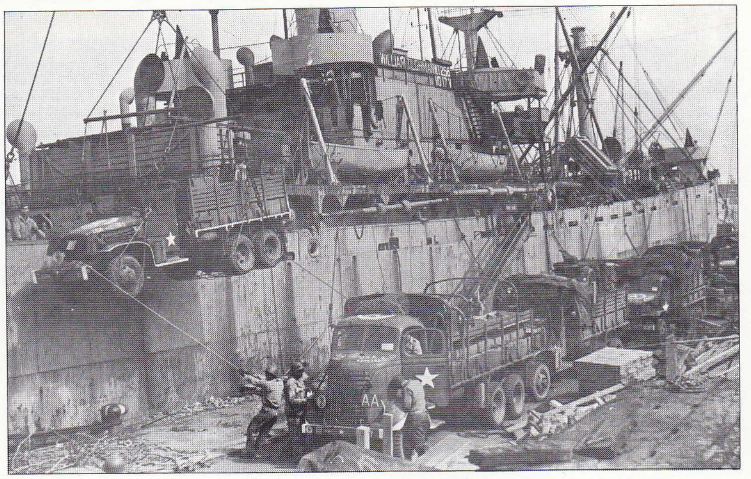
American medium trucks

When one thinks of US military medium trucks, the **GMC 2½-ton** 6×6 immediately springs to mind. However, this type is discussed overleaf and other types are treated here.

Semi-trailer tractors come into this category with designations from 2½-ton to 5-ton. These special-purpose vehicles were used to haul large trailers of all descriptions. The general-service bodies were used in great numbers during the advance across Europe, proving extremely useful in such organized deployments as the 'Red Ball Express' route. Starting with some of the less publicized vehicles, the **Autocar Model U4144T** 4×4 tractor was basically used in the USA, very few crossing the Atlantic and the US Army Air Force being a major user for the fuel bowser-towing role. Another early model, the **GMC AFKX-502-8E** COE tractor, was used to tow early horse box trailers for the cavalry. The GMC was powered by a 6-cylinder 91-kW (122-bhp) engine. Perhaps the two most popular and publicized tractors were the **Autocar Model U7144T** and the **Federal 94x93**, which were used in quite large numbers for haulage. The Autocar was used by artillery units to tow van bodies, fitted out with radio equipment mostly for use by anti-aircraft units. These trailers were designed to use a front dolly wheel for use as full towing trailer, though when the trailer was coupled to the tractor the dolly could be towed behind the whole assembly. Early vehicles had *fixed steel cabs, these later being* changed to soft tops in line with most other American-produced military transport vehicles. Many soft-top vehicles were fitted with a ring mount for a 12.7-mm (0.5-in) machine-gun. The Federal model was used in the same basic way, the power unit for this type being the Hercules 6-cylinder RXC engine.

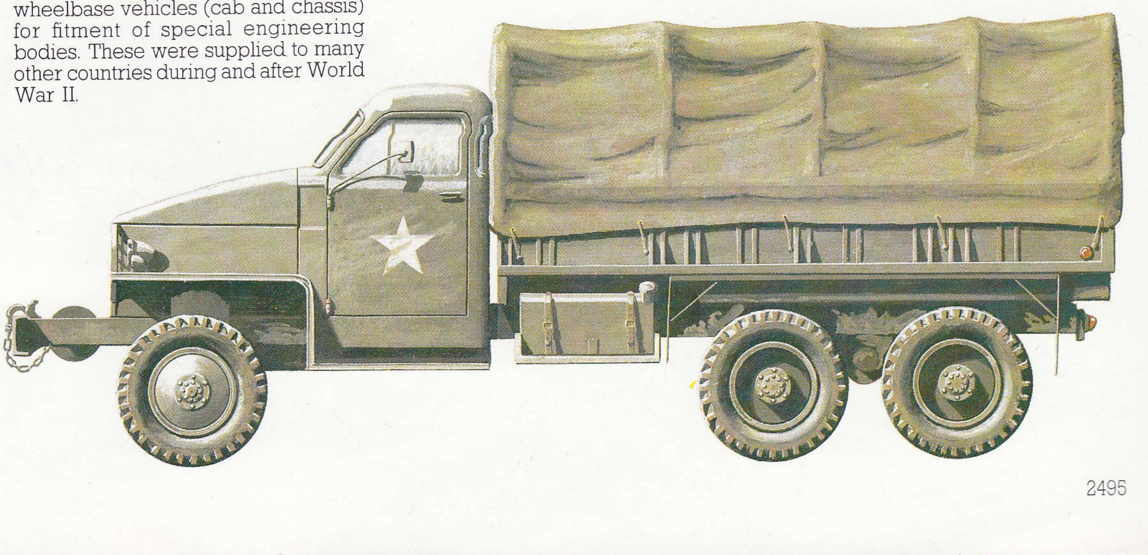
In the 4-ton cargo range the **FWD HARI** saw extensive service with American, British and Canadian forces. It was powered by a Waukesha GB2 6-cylinder engine. Many of the trucks were instrumental in hauling supplies along the Allied supply line from Persia to the USSR. One interesting deployment of the FWD in British service was its use to tow mobile smoke generators. The RAF used the truck as mobile power supply vehicles and as snow ploughs, the latter being fitted with a Bros rotary plough, for which the rear body was replaced by a large Climax R6 petrol engine unit. Transmission of power to the plough was twofold, first by V-belts to the rotary parts then through transmission shafts to the rotor assembly with a chain drive for final power to the rake.

Diamond T supplied a 6×6 medium truck, the **Diamond T 968**, this being one of the US Army's cargo trucks until the end of the war. Variants included tipper, map reproduction, wrecker and bitumen tank vehicles. A total of 10,551 was built, and a further 2,197 were supplied as long- and short-wheelbase vehicles (cab and chassis) for fitment of special engineering bodies. These were supplied to many other countries during and after World War II.



The attack transport William Tilghman *is loaded for the Allied armies in north west Europe. Visible are both major types of medium truck, including the cab-over-engine (COE) AFKWX 6×6, also made by GMC.*

Specification
Diamond T 968
Powerplant: one 79-kW (106-bhp) Hercules RXC 6-cylinder petrol engine
Dimensions: length 6.82 m (22 ft 4.5 in); width 2.44 m (8.0 ft); height 3.01 m (9 ft 10.5 in)
Weights: unladen 8357 kg (18,424 lb) and laden 11939 kg (26,320 lb)
Performance: maximum speed 64 km/h (40 mph); radius 266 km (165 miles)



Studebaker produced almost 200,000 2½-ton trucks, similar to the GMC 6×6, but more than half of that production went to the Soviet Union under Lend-Lease. Many were produced with the Studebaker commercial-type closed cab.

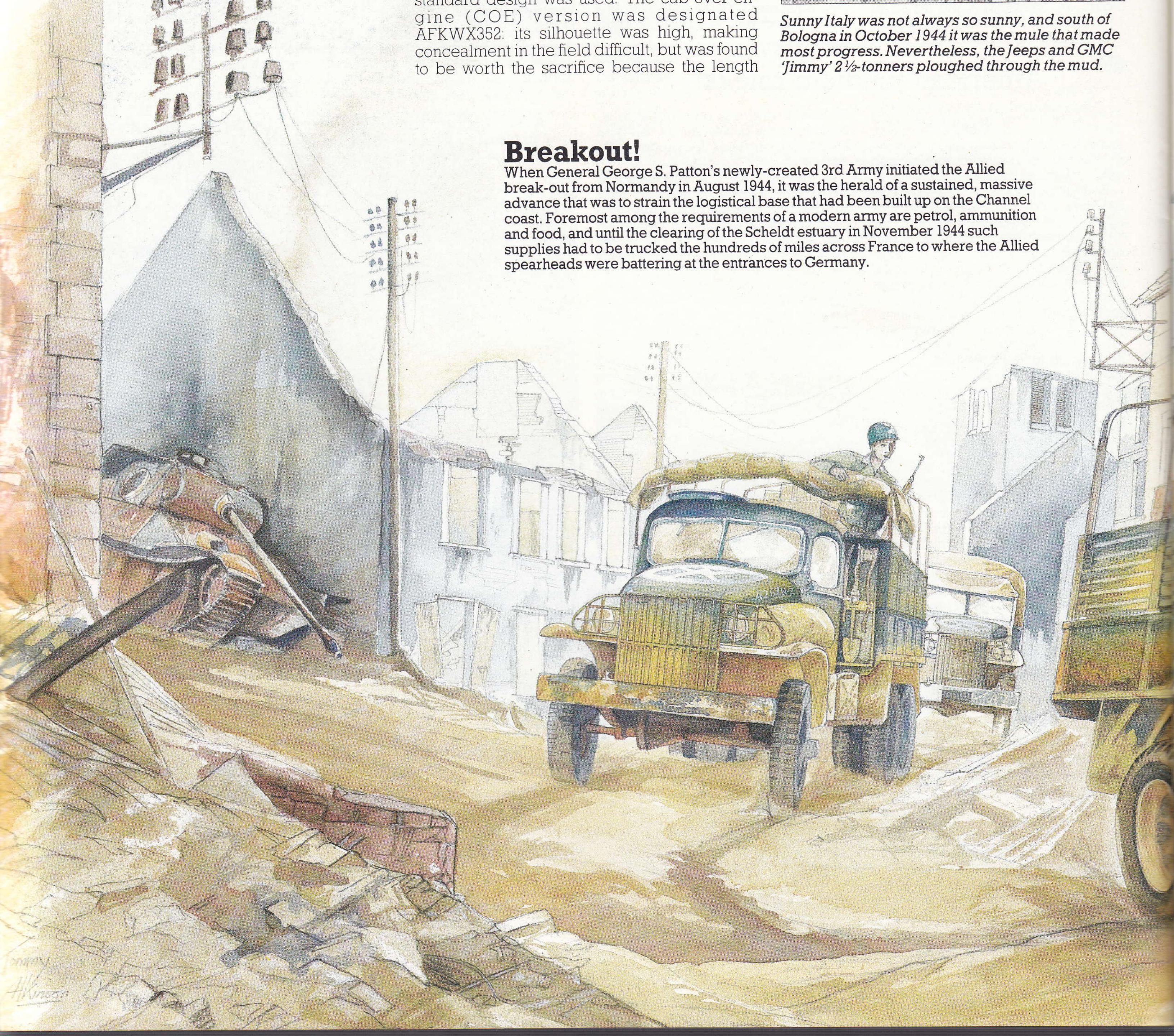
Half a million Jimmies

The break-out from Normandy and the Soviet destruction of the Army Group Centre on the Eastern Front presented the Allies with a formidable logistics problem in the summer of 1944. At the heart of the massive transport effort, the GMC 2½-ton 6×6 truck, known as the 'Jimmy', served in greater numbers than any other heavy transport vehicle.

In 1939 the design of US military trucks was standardized: only two of each type of class would be considered from commercial manufacturers. Classes of vehicles would be ½-ton, 1½-ton, 2½-ton, 4-ton and 7½-ton, and manufacturers would have to compete for production contracts. By 1941 just 16 manufacturers were eligible to compete, and their products were to include as many common mechanical parts and accessories as possible. Up to June 1940 the Quartermaster Corps had tested and approved three vehicle types: the 1½-ton Dodge 4×4, 2½-ton GMC 6×6 and 6-ton Mack 6×6.

By now Europe was at war and American involvement seemed likely. Once the Lend-Lease agreement was in operation, early GMC 6×6 trucks were shipped to the UK. Before proceeding, it is worth a look at the early development and production models. In 1939 the civil-derived GMC ACKWX353 was in production and in general use in the USA. Very few actually saw combat, but the type was used in its thousands by the armed forces and National Guard. Many were still in service after the war in home-based units. The cab and bonnet were as those of civil models, including some chrome. A heavy channel girder was added as front bumper, and a heavy-duty brushguard was fitted to protect the front. A military body of standard design was used. The cab-over-engine (COE) version was designated AFKWX352: its silhouette was high, making concealment in the field difficult, but was found to be worth the sacrifice because the length

Sunny Italy was not always so sunny, and south of Bologna in October 1944 it was the mule that made most progress. Nevertheless, the Jeeps and GMC 'Jimmy' 2½-tonners ploughed through the mud.



Breakout!

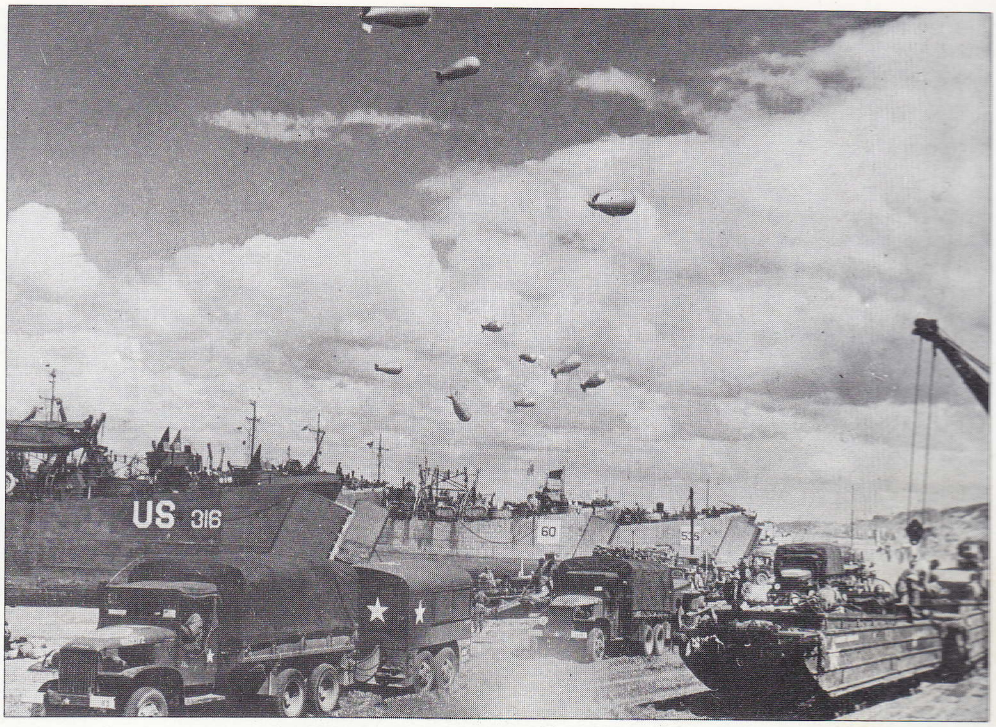
When General George S. Patton's newly-created 3rd Army initiated the Allied break-out from Normandy in August 1944, it was the herald of a sustained, massive advance that was to strain the logistical base that had been built up on the Channel coast. Foremost among the requirements of a modern army are petrol, ammunition and food, and until the clearing of the Scheldt estuary in November 1944 such supplies had to be trucked the hundreds of miles across France to where the Allied spearheads were battering at the entrances to Germany.

saved allowed a larger-capacity body to be fitted. No brushguard was incorporated, and later models had separate sidelights added to the main headlights. The succeeding model (and probably the most famed soft-skin vehicle of World War II following the Jeep) was the CCKW. Like all American trucks it was developed from off-the-shelf civil parts.

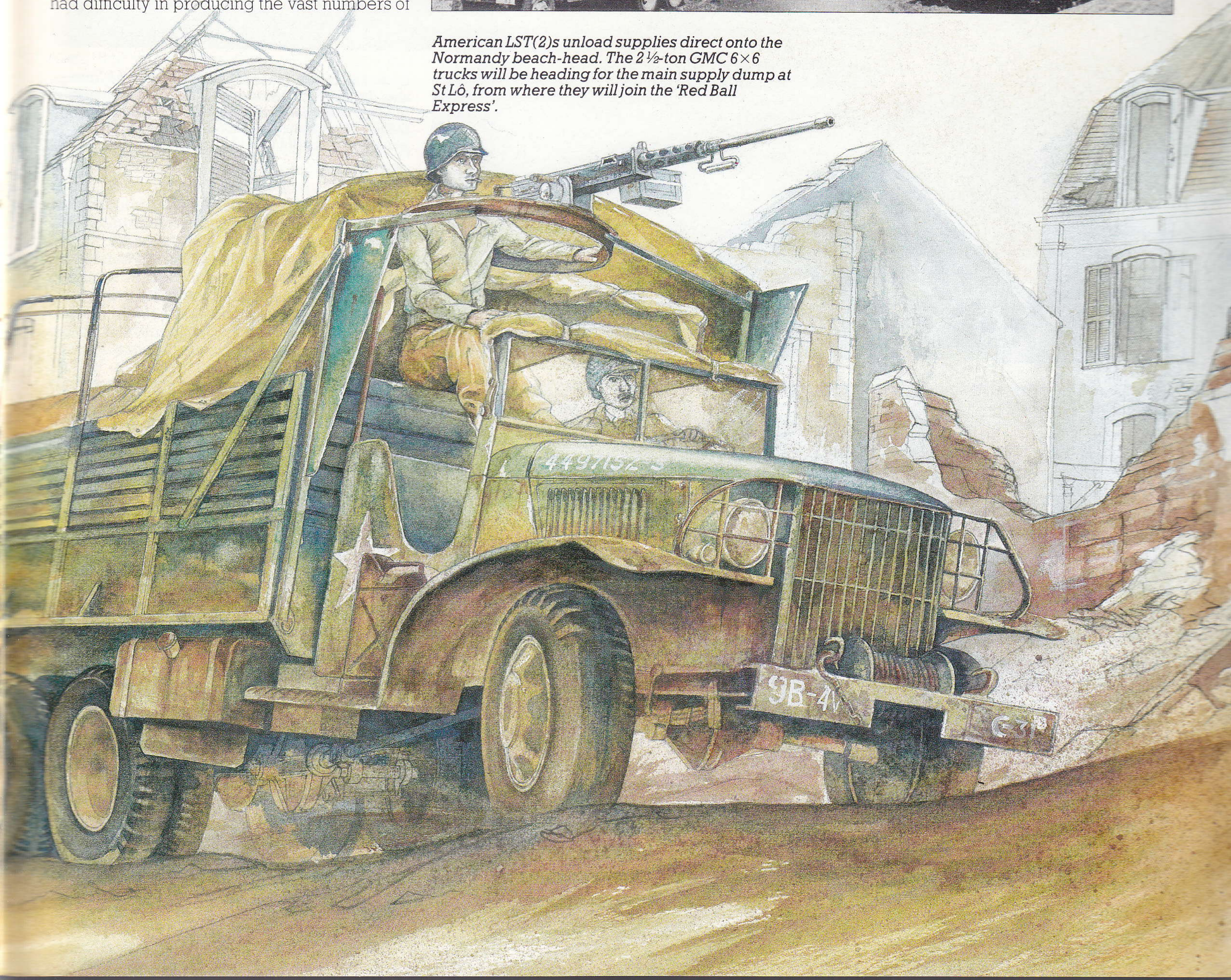
Good reliability

The reliability of these trucks over the next few years was magnificient, and indeed 40 years later is still outstanding. All early models had the steel panel cab, this being replaced from 1943 (as on all American types) with a soft-top canvas tilt and side screens. The handsome lines of the steel-panelled cab were lost during this transformation, but progress called for extra shipping height but lower silhouette. The panel cab was retained on models in service, and this type served until the 1970s in many countries. The initial orders for the normal-control types was placed with the Yellow Truck Company, a firm partly owned by GMC and later absorbed fully into the parent complex. The standard commercial bonnet then in production was replaced by a simple pressed steel unit with squared mudguards.

From the outset the Yellow Truck Company had difficulty in producing the vast numbers of



American LST(2)s unload supplies direct onto the Normandy beach-head. The 2 ½-ton GMC 6×6 trucks will be heading for the main supply dump at St Lô, from where they will join the 'Red Ball Express'.



trucks required, a situation partly resolved when Studebaker was called in to produce trucks of this type. For some reason Studebaker trucks used slightly different pressings on the cab and bonnet, and were powered by a Hercules engine. Because of the non-standard design most of these Studebaker vehicles were exported. As GMC took over the factory of the Yellow Truck Company production quickly increased, and outside contracts were also given to Reo and International Harvester.

The majority of these 2½-ton trucks were produced as cargo vehicles, but variants were numerous and included the dump truck designed for the corps of engineers with the option of use as a troop carrier. Removable seats, a front rack and an adjustable cab protector could all be used to transform the truck to a normal type general duty vehicle.

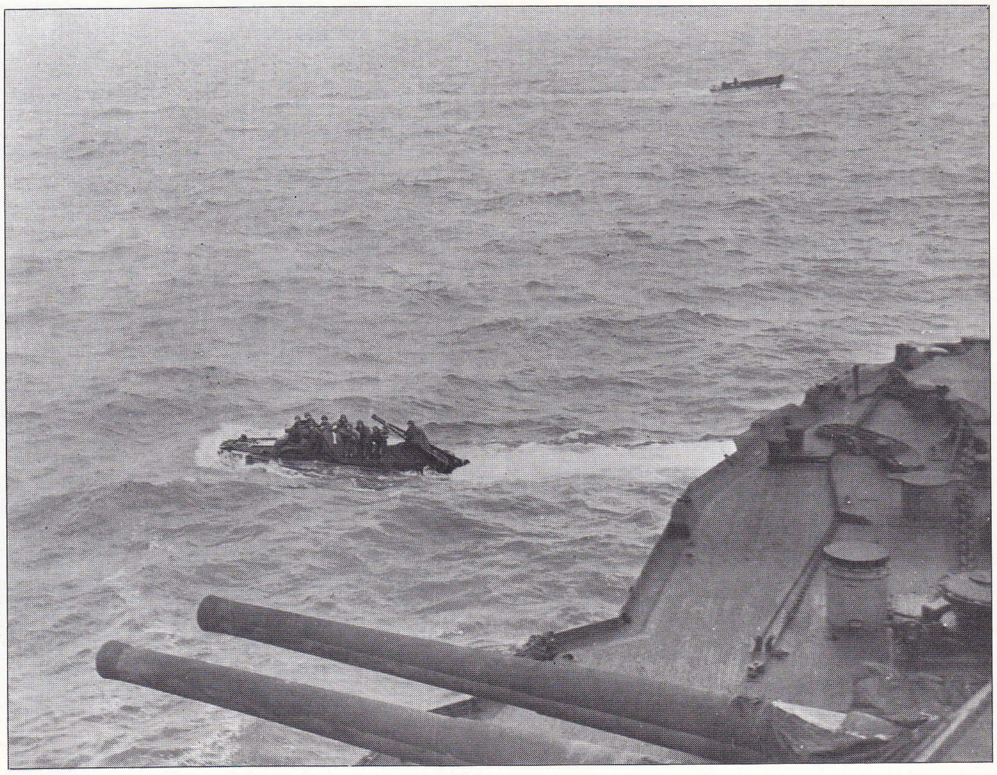
Loading problems

The Douglas C-54 transport aircraft used in the latter part of the war was equipped with tricycle landing gear which left the cargo hold more than 3.05 m (10 ft) above ground level: loading and unloading would have been almost impossible with conventional trucks, and substantial damage was envisaged to aircraft, supplies and trucks. So Garwood produced a special high-lift body for use on the ACKW353 chassis. The hydraulic scissor-lift system utilized a tailgate adjustable to varying aircraft heights, and the hydraulic feed came from a telescopic pipe mounted at the rear of the subframe.

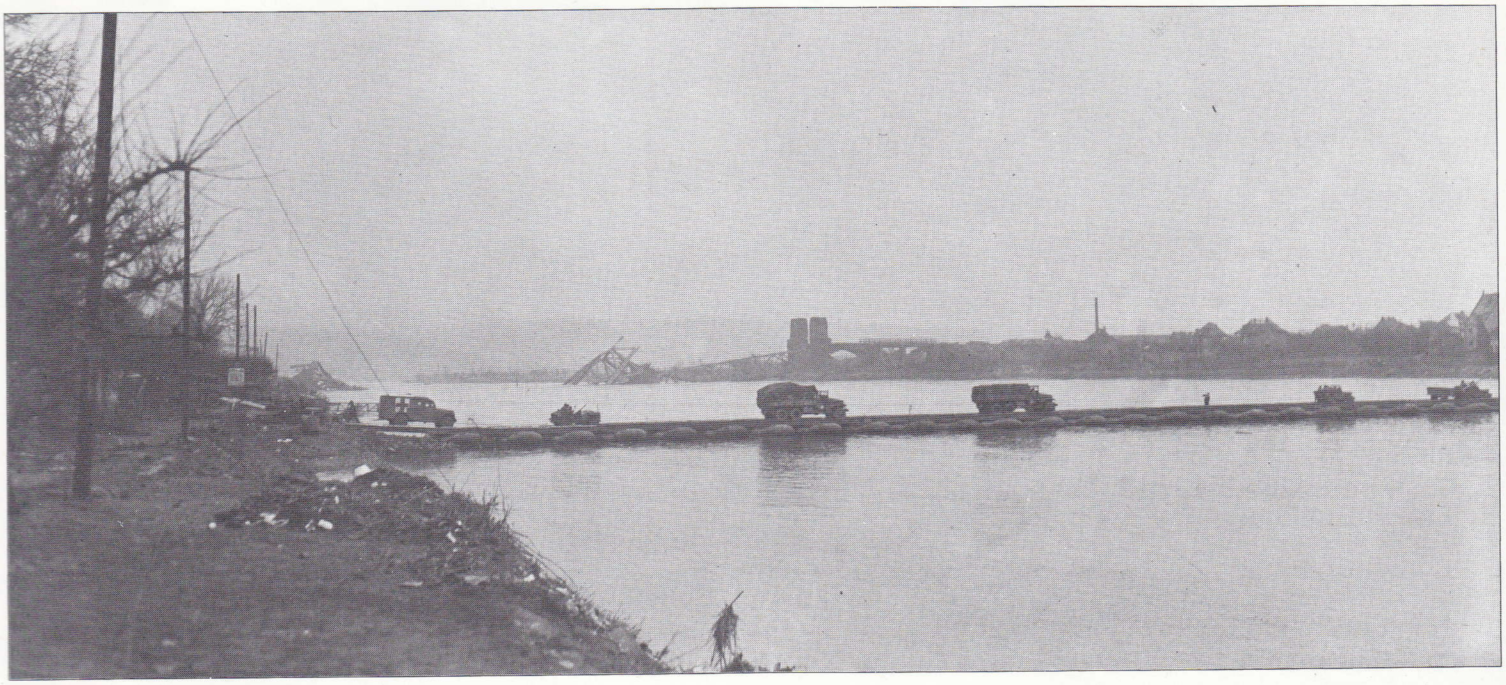
Very few GMC 2½-tonners were built specifically as wreckers, though a couple of material-handling types were often designated as such. The chemical service truck M1 featured a double channel on which a lifting hoist could travel. Its main function was to transport chemical barrels, and a special locker was built to accommodate the appropriate decontaminating materials. A more complex handling truck was issued to the army air force, consisting of two U-shaped frames in the upside down position; through the top of these passed a double-channel girder to carry the hoist used for the carriage of bombs between ammunition dumps and aircraft. The Heil Company of Milwaukee, Wisconsin, was responsible for producing this body and frame, of which 2,286 were built. One of the rarest applications for the CCKW was as a 6-wheel tractor to tow semi-trailers; most of these were based on the Chevrolet NK-G-7113 4×4 tractor.

A major development in the success of Allied amphibious landings was the introduction of a fully amphibious truck, the DUKW.

This amazing vehicle originated from the urgent need to discharge supplies from ship to shore when many port facilities were out of action and ships were frequently forced to wait weeks to unload their cargoes. A standard GMC 2½-ton chassis was used and a complete boat shaped body was fitted around it. One pilot model was built and demonstrated to the US Army, but was not at first greated with en-



One of the more unusual adaptations of the Jimmy was the DUKW, an example of which is seen over the bow of the old battleship USS* Arkansas *on D-Day. More than 21,000 of the fully amphibious trucks were built by 1945.



Wherever the armies went, the Jimmies went too. A convoy crosses the Rhine on the pontoon bridge built to replace the famous bridge at Remagen (seen in the background) which finally collapsed 10 days after its capture.

thusiasm. At about this time Colonel McAuliffe was faced with the problem of landing supplies on European beaches. After an introduction and demonstration McAuliffe initiated an order for 2,000 vehicles, the first of about 21,000 built up to late 1945. Technically it was apparent that the GMC powerplant, transmission, transfer case and all mechanical components could be used without too many problems. A decision to economize on steel led to construction of the driver's compartment in plywood, though the hull was fabricated of welded steel plate. The propeller tunnel was raised as high as possible at the rear of the body as a compromise between an aft location for increased efficiency and a forward location for reduced vulnerability. To assist in clearing shipped water three bilge pumps were specified: a self-priming manifold pump, a standby high-capacity pump and a hand pump for use when the propshaft was not turning.

Lend-Lease vehicles

The first GMC 6×6 vehicles to see action were probably the earliest models sent to the UK under the Lend-Lease agreement. The earliest recorded action with American units was in the Pacific theatre, although much larger numbers were used in Europe and North Africa. The first of these to see action was during the Allied assault on North West Africa: it was here, during the advance on the Kasserine Pass, that many were destroyed by the Germans. After the defeat of the Axis forces in Africa, thoughts turned towards the invasion of Sicily and Italy, and to the eventual landings in France. During all of these campaigns the 2½-ton GMC, or Jimmy as it had become known in the field, performed with outstanding success. During the landings in the south of France the French units involved were supplied solely with equipment from the USA, including hundreds of 2½-ton 6×6 trucks.

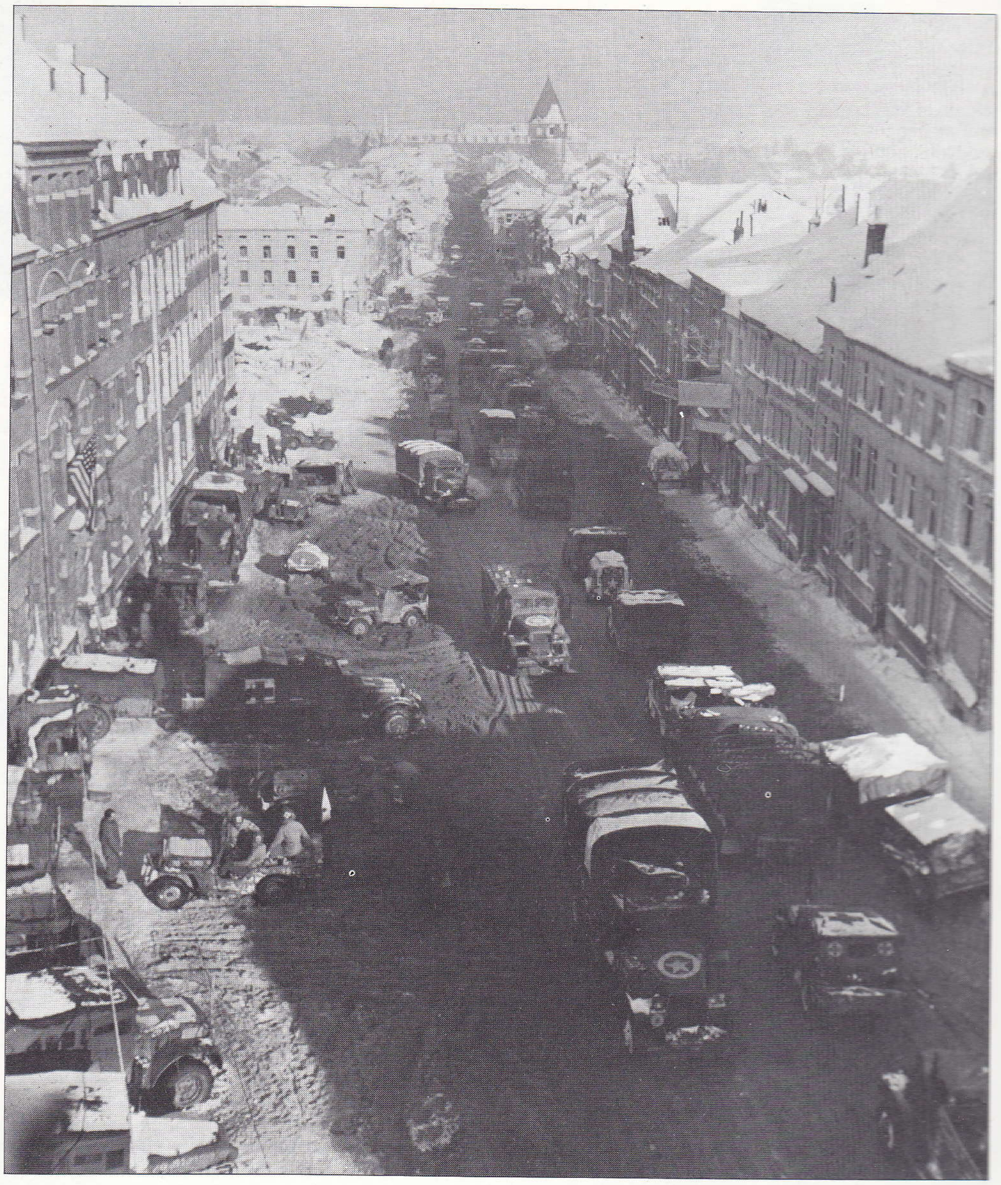
Perhaps the greatest requirement for trucks came with the invasion of North West Europe. During the early stages following D-Day only a limited number of trucks could operate because of the size of the beach-head, and vehicles were to a degree stifled in movement. The DUKW came into its own during these early days before the 'Mulberry' harbours could be erected, shipping stores from ship to shore dumps before the supplies were taken forward in trucks to the front line. By D+60 about 2,000 DUKWs were operating on the Normandy coast, about 800 of them in British service. During these first few days much wreckage was floating about, causing a high destruction rate to DUKW propellers and rudders. Many tragedies occurred with DUKWs, but such had been expected given the environment in which the vehicles worked.

DUKW landings

A similar fate attended the landing of US Marine Corps howitzers by DUKW during the Iwo Jima landings in the Pacific. Twelve loaded DUKWs were to disembark from their tank landing ship: in a heavy sea the first vehicle out promptly sank with gun and crew, and the same fate befell the following seven. Four DUKWs managed to start the shoreward journey: two DUKWs were swamped on the shoreline, making it impossible to rescue the guns, and only two howitzers could thus be brought into action.

Back in Europe the breakout from Normandy left long supply lines to be maintained. Without these the vast Allied armies would soon have come to a halt (and on occasion did) so special supply routes were organized, the most famous being the American 'Red Ball Express'. This organization ran trucks day and night on selected routes cleared of all civilian and non-essential military traffic, and because of the narrow French roads a one-way system had to be devised. Supplies were loaded at St Lô then dumped at an area west of Paris. On the return journey the trucks travelled on a different route, thereby creating a huge loop. GMC 2½-ton trucks were used in their hundreds on this route to carry fuel, supplies and ammunition. Many trucks towed cargo or fuel trailers. As was to be expected, the long journey took a heavy toll of both drivers and trucks, so maintenance and recovery depots were placed at stages along the route. Some 132 truck companies were used in the early days of this supply line.

GMC 2½-ton trucks are still in service, French-owned vehicles being sold as surplus in 1985. Israel still has the type on its inventory, as do many third-world countries. Post-war 2½-ton trucks were based on the same design, and this type of truck will remain in American military service for many years to come.



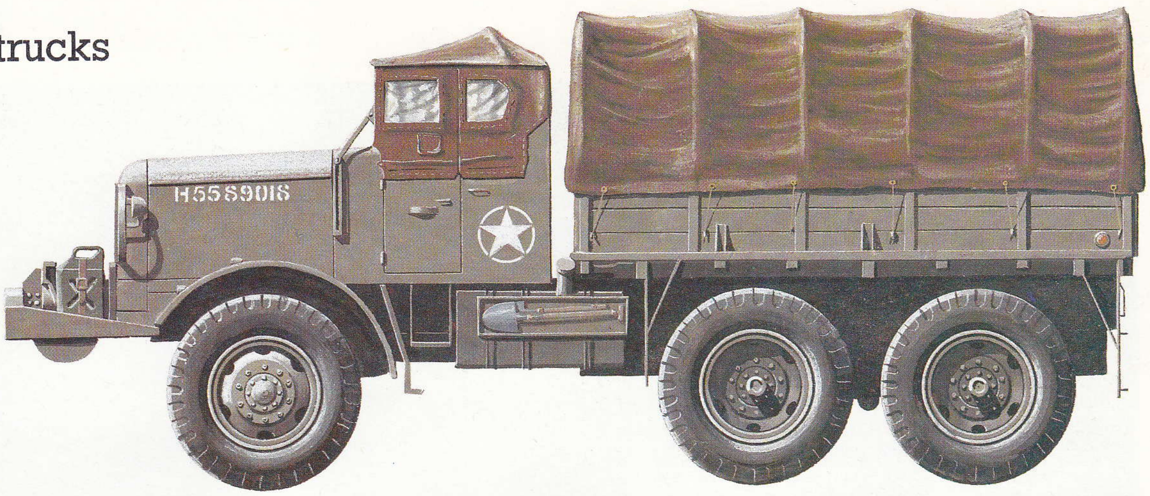
January 1945, and the German thrust through the Ardennes has been blunted. Vehicles of the 90th Infantry Division move through the centre of Bastogne, which had been heroically held by the 101st Airborne Division.

ROUTE RESERVEE AU
TRAFIC MILITAIRE
INTERDICTION ABSOLUE
DE CIRCULATION CIVILE
SOUS PEINE DE POURSUITES

The 'Red Ball Express' was typical of military logistics routes in that it was reserved solely for military traffic. What civilian traffic existed was strictly forbidden to use the roads, in order to allow the maximum flow of logistics to the front.

USA

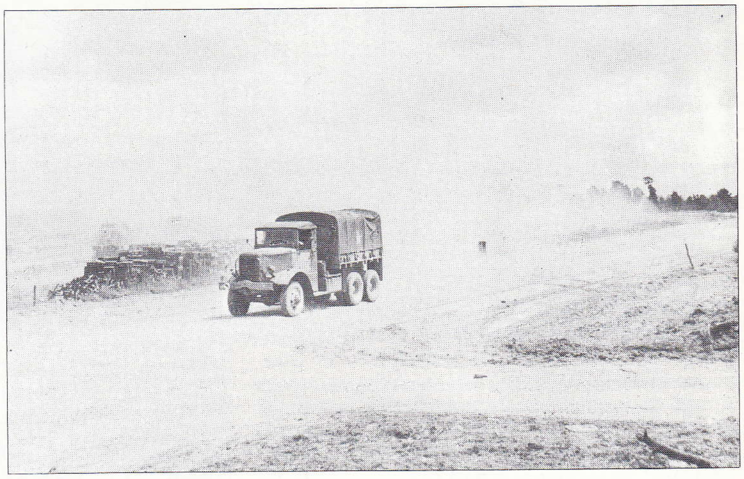
Mack heavy trucks


Above: The Mack 7½-ton 6×6 Model NO2 prime mover was largely used to tow the 155-mm 'Long Tom' gun and the 8-in howitzer. Other models were used as wreckers.

The Mack company is one of the oldest American truck manufacturers still in existence, the company having started in 1889 as wagon builders. With the advent of the combustion engine Mack was well to the fore in the age of truck progress, and by 1939 was well established to produce trucks for military use.

The first types to see combat were supplied to the British in the Western Desert and consisted of two 6×4 types, the **Mack EXBX** and **NR4**. Supplied in cab and chassis form, these were bodied as tank transporters to carry light tanks, such as the 'Honey' (M3 Stuart) tanks then in use by the British. The NR4 had detachable ramps, while the EXBX had a hinged arrangement nicknamed 'Bees Knees'. The NR4 was also supplied as a general-service carrier for long hauls across desert terrain. The rear bogie axles were spaced farther apart than normal, to accommodate the larger 1400×20 high-flotation tyres that were a 'must' in soft sand conditions. All EXBX cabs were of steel construction based on the pre-war civil type. The NR4 had an open military cab with canvas top, or alternatively an all-steel cab was supplied. When the vehicle was used in hot areas a spacer plate was fitted to the roof for cooling purposes. Many of these trucks were also used to supply the USSR via Persia. The famous 'Red Ball Express' supply route across North West Europe also made extensive use of the NR models, many towing four-wheel trailers. Perhaps the most prominent Mack truck, the result largely of its immense size and power, was the 7½-ton **NO** 6×6 vehicle used by American and British armies to haul heavy artillery such as 155-mm (6.1-in) howitzers. First seen in action in Italy, where heavy artillery was required to blast out enemy strongpoints, the Macks had to negotiate hair-raising bends in the slow advance. An unusual feature on the NO model was that it dispensed with the usual universal joint on the front wheel drive in favour of a bevelled double gear reduction in the axle ends to allow both drive and steering. A large yoke was installed in the rear of the body, angled out and fitted with a chain, block and tackle, for the purpose of lifting the trail of the heavy guns when the front limber was not in use. Most post-war British variants had this item fitted. The Canadian army was also a major operator of Mack heavy trucks during World War II.

Specification
Mack NO
Powerplant: one 118.6-kW (159-bhp) Mack EY 6-cylinder engine
Dimensions: length 7.54 m (24 ft 9 in); width 2.62 m (8 ft 7 in); height 3.15 m (10 ft 4 in)
Weights: unladen 12701 kg (28,000 lb) and laden 19813 kg (43,680 lb)


The Mack NM series of 6-ton 6×6 trucks was developed from a commercial design of 1939, but was similar to the standard design built by Brockway, Corbitt or White.

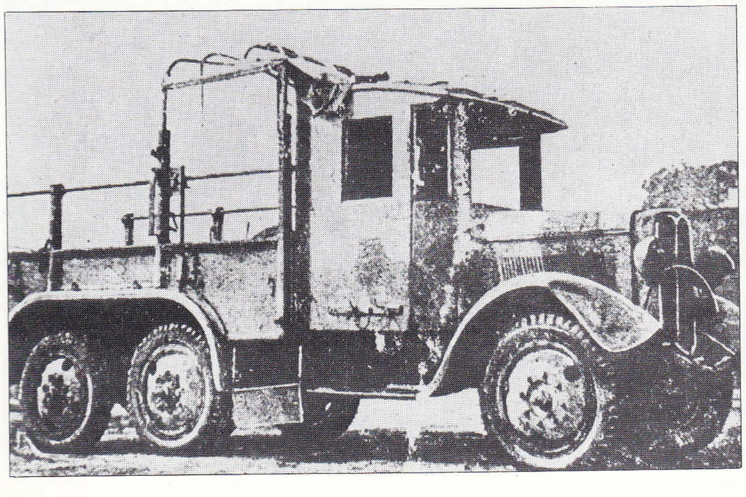
JAPAN

Japanese trucks

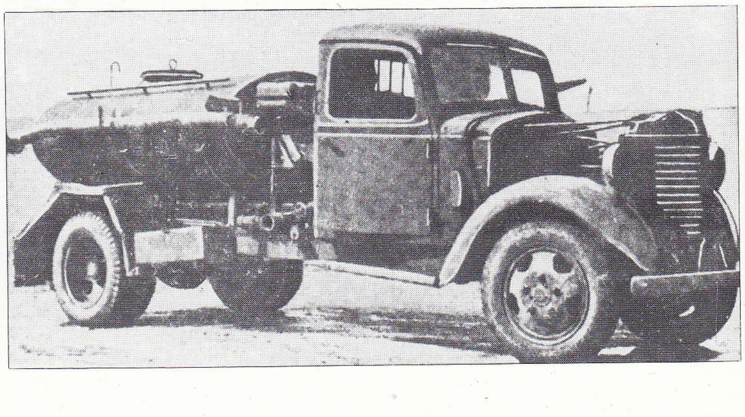
Japanese industry produced trucks on similar lines to other countries, but in much smaller numbers. The lighter end of the scale saw 1½-ton to 2½-ton 4×2 trucks. Typical of this type was the **Nissan 80** cargo truck, patterned on the American Federal CDE. Trucks sold to the civil market were of the same design, and an attractive subsidy was offered in anticipation of the need to conscript vehicles. The **Toyota KB** 1½-ton 4×2 was powered by a 6-cylinder 48-kW (65-bhp) engine, and again American design influence was evident as this vehicle was patterned on the Chevrolet 1936 model. The **Nissan 180** 2½-ton cargo was a late model and featured a wooden cab, and a modified version with steel panel cab was used post-war by the Japanese self-defence forces. By far the most popular vehicle in the Japanese truck industry was the **Isuzu Type 94** produced in 6×4 configuration with a limited number of 4×2 models. About 40 different variants were built on this chassis. The six-wheeled truck also served as an artillery prime mover. One interesting development to emerge was the amphibious **Toyota SUKI**: the body was boat shaped and fabricated of steel plates, and the axles and wheels were suspended beneath this body. Nearly 200 of these 2-ton trucks were built. Very few Japanese heavy trucks were produced, the **Isuzu Type 2** 7-ton being one example; power was supplied by a 6-cylinder 75-kW (100-bhp) engine.

Specification
Isuzu Type 94
Powerplant: one 52.2-kW (70-bhp) 4-cylinder diesel engine (Type 94A) or 6-cylinder diesel engine (Type 94B)
Dimensions: length 5.43 m (17 ft 9.8 in); width 1.95 m (6 ft 4.8 in); height 2.25 m (7 ft 4.6 in)

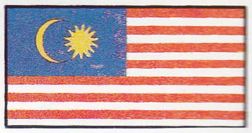
While the basic Isuzu 1½-ton 6×4 was used as a prime mover and general-purpose truck, some 40 special-purpose variants were built on the chassis.



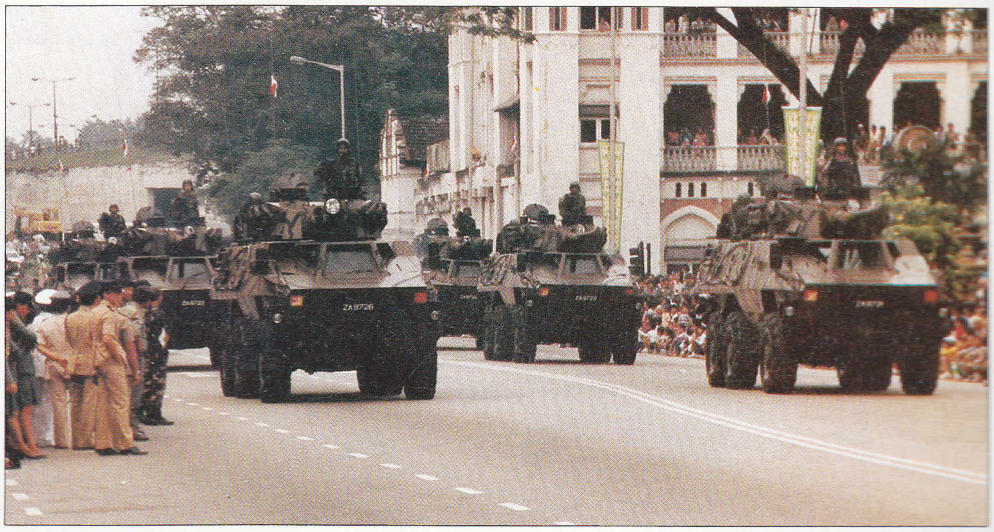
Water supply was often a problem on Japan's far-flung island empire, so trucks such as the Nissan 180 1½-ton 4×2 were often used as water tankers.



Malaysia



Malaysia's armed forces are relatively young, the nation having come into being only in September 1963. Virtually all the arms and equipment in service at that time originated from British sources. Since that period, however, as replacements and additions have become necessary the armed forces have looked further afield for their requirements. The only military operations that have been undertaken in the wake of independence have been against Communist guerrilla groups operating along the remote Thai border areas and in the inaccessible border region between Sabah, Sarawak and Indonesia. Just as during the Malayan Emergency of 1949-60, the terrorists retain the initiative in choosing where to strike, with the result that the army and police, even in collaboration with the Thai armed forces, generally fight a containment campaign rather than an all-out war. Units of both armies have scored several notable successes against Communist base camp areas in recent years.



Since about 1980 Malaysia has steadily increased her defence expenditure in response to the threat from Communist Vietnam and Laos. Recent acquisitions have included Condor APCs from Thyssen Henschel, Scorpion reconnaissance vehicles from Alvis, and these SIBMAS 6×6 armoured fire-support vehicles.

The Army

Over the past five or so years, Malaysia has spent considerable amounts of her gross national product on upgrading and expanding her armed forces in order to meet a projected military threat from the Communist countries of Laos, Kampuchea and Vietnam to the north. The army has increased its strength to 100,500, and the following units and formations are in being:

one corps HQ,
four divisional HQs,
12 infantry brigades (with 35 infantry battalions, one mechanized infantry battalion plus more forming, and support units),
four armoured cavalry reconnaissance regiments,
four field artillery regiments,
one air-defence regiment,
five signals regiments, and
one special forces brigade group.

To outfit the mechanized infantry battalions and the newly formed Malaysian Armoured Corps a competition was opened in 1978 for a new generation of armoured vehicles. By 1981, and after much changing of operational requirements and procurement numbers, a series of contracts was signed with several West European manufacturers. These included deals with the Belgian firm SIBMAS for 162 of its 6×6 Armoured Fire Support Vehicle (with the two-man Cockerill CM-90 turret and 90-mm/3.54-in Mk III gun) plus 24 of the AFSV's armoured recovery vehicle version; with the West German firm Thyssen Henschel for 459 examples of its Condor 4×4 armoured vehicle in the APC (with either a 20-mm cannon or twin 7.62-mm/0.3-in turret), command post and ambulance versions; and with the British firm Alvis Limited for 26 of its Scorpion tracked reconnaissance vehicles equipped with the Cockerill 90-mm gun, and for 25 of its tracked Stormer APC model (12 fitted with the 20-mm gun turret and 13 with the twin 7.62-mm MG turret). An MBT and IFV procurement to complement these vehicles in an armoured regiment was shelved when the West German government refused to grant an export licence to Thyssen Henschel for its TAM tank and TH-302 APC.

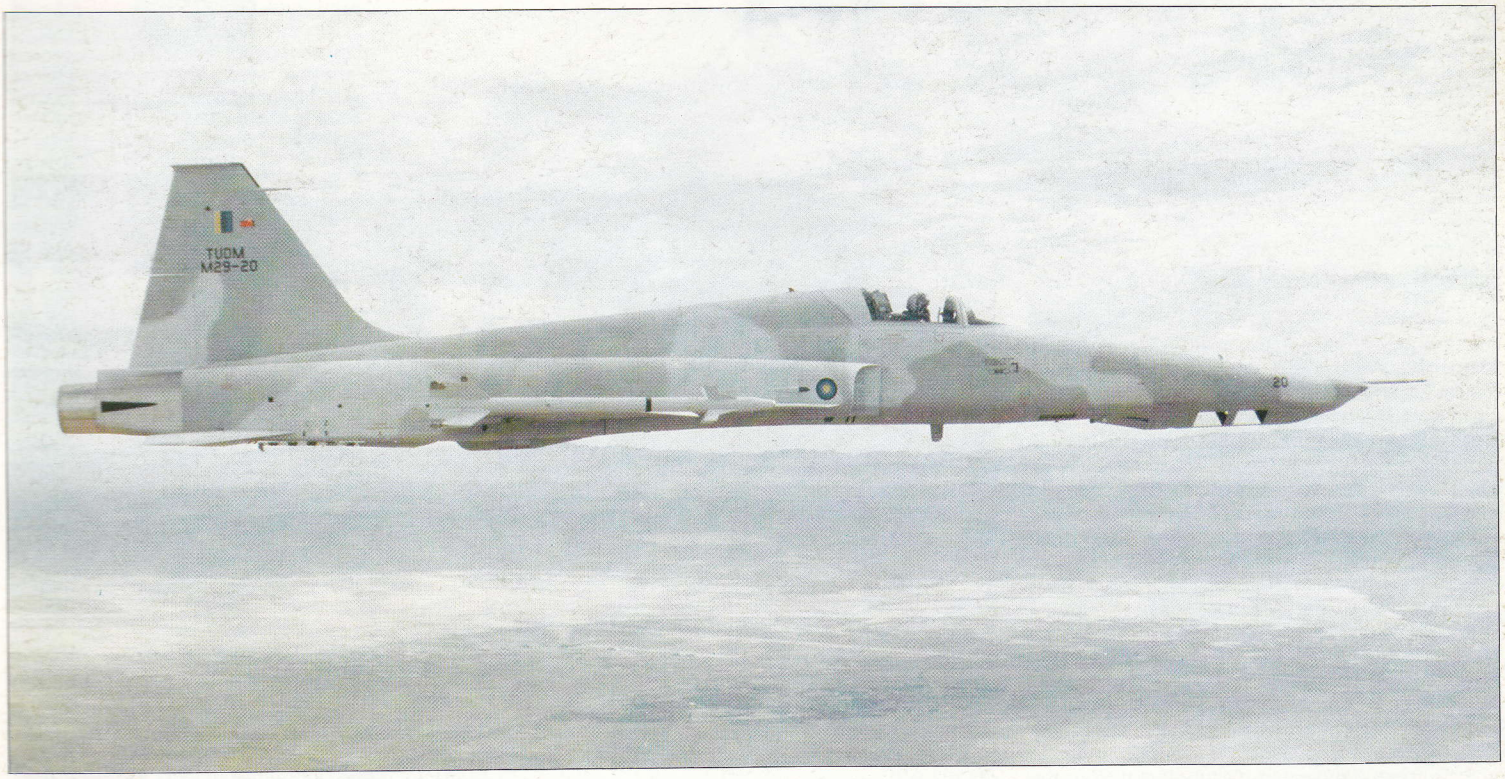
The new vehicles join a collection of American, French and British types which will gradually be passed on for second-line and internal security duties. These include some 93 Ferret scout cars, 100 or so AML-60 and AML-90 armoured cars, 40 or so Panhard M3 APCs, 100 of the original Cadillac Gage V-100 Commando and 138 of the later V-150 Commando armoured vehicles fitted with either twin 7.62-mm MG, 90-mm MECAR gun or 20-mm cannon turrets. The 12,000-strong Police Field Force also operates specialist internal security armoured vehicles in the form of the GKN Sankey AT-105 APC, the Short SB401 APC and Shorland patrol car.

The other major arm of the Malaysian army is the artillery. This operates only two types of weapon; the lightweight Italian Model 56 pack howitzer, of which some 114 are in service, and around 12 elderly British 139.7-mm (5.5-in) medium guns.

A full list of the equipment used by the Malaysian army includes the following:

armour: Scorpion 90 light tanks; Stormer, Condor, Commando V-100, Commando V-150, SB401, AT-105 and Panhard M3 APCs; Ferret scout cars; Shorland patrol cars; AML-60 and AML-90 armoured cars; and SIBMAS fire support vehicles;
artillery: (towed) 105-mm (4.13-in) M56 pack howitzers and 139.7-mm (5.5-in) medium guns; (mortars) 81-mm (3.19-in) British L1;
anti-armour weapons: 89-mm (3.5-in) M20 rocket-launchers; 106-mm (4.17-in) M40 and 120-mm (4.72-in) MOBAT recoilless rifles; and SS.11 ATGWs;
anti-air weapons: 40-mm L/70 Bofors and 40-mm M1 Bofors; and
small arms: 9-mm Browning pistol; 9-mm Sterling SMG; 5.56-mm (0.219-in) M16A1, 5.56-mm HK33, 5.56-mm AR70, 7.62-mm (0.3-in) G3 and 7.62-mm FAL automatic rifles; 7.62-mm L4 Bren LMG; 7.62-mm L7 GPMG; and 12.7-mm (0.5-in) Browning HMG.

The Malaysian armed forces were forged in the long confrontation with Communist insurgents from 1949 to 1960, and when the nation came into being in 1963 most of the equipment was of British origin. Here two Malaysian soldiers return from operations against Communist guerrillas near the Rajang river.



Malaysia has recently purchased two Northrop RF-5E Tigereye reconnaissance aircraft; this one sports the new national insignia on the engine intake. Malaysia's F-5E Tiger IIs are now being supplemented by 36 refurbished McDonnell Douglas A-4 Skyhawks.

Designed as a private venture by BN Constructions Ferroviaries et Metalliques, the SIBMAS APC has been ordered in two different versions. Seen here in typical Malay jungle, this is the AFSV model armed with Cockerill CM-90 turret and 90-mm Mk III gun.

The Air Force

To support the army in the field during counter-insurgency operations and to provide the primary deterrence to outside aggressors there is a 13,000-strong air force, which is divided into two Air Regions and a Support Command. The main strike force comprises a single fighter squadron with 13 Sidewinder-equipped Northrop F-5E Tiger IIs, four F-5F operational trainers and two recently-delivered RF-5E Tigereye tactical reconnaissance fighters. Furtheg combat squadrons are being formed with 36 refurbished McDonnell Douglas A-4 Skyhawk fighter-bombers and six TA-4 Skyhawk operational trainers from the USA. There are also two dual-role COIN/training squadrons flying 12 Aermacchi M.B.339 advanced trainer/light strike aircraft, which displaced the 12 or so surviving Canadair CL-41G Tebuans that are now with the 600-man Air Force Reserve.

All primary and basic training duties are undertaken by the three flight schools which fly mainly the Pilatus PC-7, with a few remaining BAe Bulldog 102s and a handful of Bell 47G and Aérospatiale Alouette III helicopters. Transport, liaison and VIP duties are handled by four squadrons of fixed-wing aircraft: one with six Lockheed C-130H Hercules, two with 14 de Havilland Canada DHC-4 Caribous and one with two BAe 125s, two Fokker F.28s and 12 Cessna 402Bs. There is also a maritime patrol/SAR squadron with three specially configured Lockheed C-130H-MP Hercules transports. All helicopter lift and liaison operations are flown by two squadrons equipped with 36 Sikorsky S-61A-4 Nuris and two squadrons with 24 Alouette IIIs.

The Navy

To match the army's modernization plans the 11,000-strong navy has embarked on its own programme, of which the two MM.38 Exocet-armed West German 'Type 1500' class frigates about to be delivered are the largest component. These will join the Yarrow-built *Rahmat* and the ex-British 'Type 41/61' *Hang Tuah* frigates as the largest surface unit combatants. The frigates are supported by a moderately sized light forces fleet that comprises four 'Spica-M' class MM.38 Exocet-armed missile boats (with a further four MM.40 Exocet-armed units on order), four 'Perdana' class MM.38-armed missile boats, six 'Jerong' class 40- and 57-mm Bofors-armed fast attack craft and 22 40-mm Bofors-armed large patrol craft of the 'Kedah', 'Sabah' and 'Kris' classes.

The mine warfare fleet has been completely rebuilt, ex-British 'Ton' class minesweepers being replaced by four modern Italian-built 'Lerici' class minehunters equipped with the latest French minehunting system and PAP-104 mine disposal vehicles.

Similarly the fleet support component has been increased by the recent commissioning of three West German- and South Korean-built logistic support vessels which can undertake not only underway replenishment with stores and fuel, but also the training, command and control and troop transport roles. All three have a helicopter landing deck aft, together with a vehicle deck, embarkation ramps to port and starboard plus a divers' decompression chamber. To aid in the amphibious warfare role there are also two ex-American LSTs which double as light forces tenders, plus five LCMs, 15 LCPs and nine RCPs. There are also a small number of auxiliary vessels and two survey ships.

The Police

The Royal Malaysian Police has recently commissioned two 1,300-ton coast guard patrol cutters built in South Korea, and two more are planned. These vessels have facilities to carry and operate one of the air force's Sikorsky S-61A-4 helicopters if required. The larger units are supplemented by 15 'PZ' class patrol boats fitted with a 40-mm Bofors gun and some 36 smaller patrol craft carrying 20-mm cannon and 7.62-mm MGs. There is also a small customs and excise force with six large and one small patrol craft that carry small arms.

The reserves for the navy number 600, although both these and the actual active numbers are to be increased over the next few years. The army's reserves total 60,000 men with 45,000 more in the Malaysian Territorial Defence Army and 15,000 in the Local Defence Corps. In addition to the 21 battalions of the Police Field Force there are 89 units with 3,100 men in the Area Security Unit (or Home Guard), and 1,200 border scouts (in Sabah and Sarawak). All of them serve in the paramilitary role, together with some 250,000 personnel of the People's Volunteer Corps (or RELA) organization.

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